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THE NORTH AMERICAN SPECIES OF RUMEX

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EDITOR

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INTRODUCTION

Among the North American species of Rumex are the following described by Linné: R. Acetosa, R. Acetosella, R. alpinus, R. Britannica, R. bucephalophorus, R. crispus, R. dentatus, R. maritimus, R. obtusifolius, R. persicarioïdes, R. pulcher, R. sanguineus, and R. verticillatus. Only four of these species are indigenous: R. Acetosa, R. Britannica, R. persicarioïdes, and R. verticillatus. All the others are introduced from Europe, except R. dentatus, which is originally from Asia, and most of them only a short time ago. The group of R. salicifolius, so characteristic for North America, is not represented among the Linnaean species.

The genus Rumex has been monographed only twice as a whole, by Campdera, in 1819, and by Meisner apud De Candolle, in 1856.


Trelease in 1892 published a Revision of the species of Rumex occurring north of Mexico. He mentions twenty-one species: R. Acetosella L., R. hastatulus Baldw., R. Geyeri (Meisn.) Trel., R.


Since Trelease's paper there have been published fourteen other North American species and some varieties, all by American authors: (R. Bakeri Greene), (R. coninus Greene), R. densiflorus Osterh., R. fascicularis Small, R. fenestratus Greene, (R. gracilipes Greene), R. hesperius Greene, R. lacustris Greene, (R. Langloisii Small), (R. polyrhizus Greene), R. praecox Rydb., (R. procerus Greene), (R. salinus A. Nels.), R. spiralis Small. The names in parentheses do not seem to me to be valid and appear in this paper as synonyms or varieties. Most of these species have been mentioned in their respective local floras, but for the most part no one has undertaken to define their systematic position, consequently a new general revision of the North American species of Rumex seems desirable.

In the present paper forty-nine species and four hybrids are recorded from North America, including Mexico, of which thirty-five species are indigenous and twelve introduced; as regards a few species it is not quite certain whether they are really introduced. Among the alien species are ten or eleven of European and Mediterranean origin, one from South America, and one from eastern Asia.

Special attention should be called to the fact that only three spontaneous hybrids are recorded from North America; in only one of them does an indigenous North American species take part, the two others being of introduced European parents. In striking contrast, there are known in Europe several dozens of hybrids, and many of them occur frequently wherever the parents grow together.

Thirty of the thirty-five indigenous North American species are endemic: that is, are not found naturally outside the continent. The range of the five remaining species is as follows: two are arctic-circumpolar (with interruptions), one (or perhaps two or three, since the question whether they are spontaneous in the New World is not solved) is widely spread over the temperate zone of the northern hemisphere, and one species ranges widely over North and South America, with wide interruptions in the tropical regions.

Seven species and one hybrid are described by me. A large part of the increase in number of species is due to division of the collective species R. salicifolius in the sense of earlier authors. By courtesy of
American institutions, I have been able to study extensive material, which has shown that the number of more or less distinct types in the relationship of *R. salicifolius* is rather large and that most of them are confined to definite areas. That these areas are natural ones, that is, correlated with climatic and geographic-geologic facts, is scarcely open to discussion, since similar areas have been defined frequently by American workers for genera not particularly susceptible to extraneous influences, such as that of man (see Fernald, Persistence of plants in unglaciated areas of Boreal America, Mem. Gray Herb. 2. 1925).

I acknowledge my great indebtedness to the directors of many American and European institutions and their staffs for liberal loans of important collections. A list of the herbaria follows:

Be. Botanisches Museum, Berlin-Dahlem, Germany.
Br. Botanisches Institut der Masaryk-Universität, Brünn.
Ca. University of California, Berkeley.
Ch. Field Museum of Natural History, Chicago.
Cl. Botanisches Institut der Universität Cluj, Roumania.
Co. Columbia College, New York (containing the Meisner Herbarium).
De. Herbier Delessert, Conservatoire Botanique, Geneva.
G. Gray Herbarium, Cambridge.
H. Botanisches Staatsinstitut, Hamburg.
Ke. Royal Botanic Gardens, Kew.
Ko. Botanisches Museum der Universität, Copenhagen.
Le. Botanischer Hauptgarten, Leningrad.
Mu. Botanisches Museum, Munich.
MW. Botanische Abteilung des Naturhistorischen Museums, Vienna.
P. State College of Washington, Pullman.
St. Botanische Abteilung des Reichsmuseums, Stockholm.
SL. Missouri Botanical Garden, St. Louis.
UW. Botanisches Institut der Universität, Vienna.


Z. Botanisches Museum der Universität, Zürich.

Among the numerous friends who have aided in various ways in preparation of this work I thank especially Dr. Harold St. John for many most helpful suggestions regarding literature and location of American collections and for geographical data; Dr. Theodor Just, for photographs of Greene types; and Dr. Frida Rechinger for the drawings. J. Francis Macbride helped me kindly in matters of phraseology.

NATURAL ARRANGEMENT OF SPECIES

From my standpoint the indigenous and more important introduced American species of Rumex may be separated into the following subgenera, sections, and subsections:

SUBGEN. I. Acetosella (Meisn. apud DC. 63. 1856, pro sectione) Rech. f.

Flores dioici (vel polygami); perigonii flororum foeminorum folia interiora fructificationis tempore non dilatata vel nuce ad summum 2-plo maior, omnino ecallosa. Folia saepe hastata vel sagittata.—R. Acetosella L., R. graminifolius Lamb.

SUBGEN. II. Acetosa (Campd. 1819, p.p.; Meisn. apud DC. 64. 1856, pro sectione) Rech. f.


SUBGEN. III. Lapathum (Campd. 1819; Meisn. apud DC. 42. 1856, pro sectione) Rech. f.


Sect. A. Axillares Rech. f., sect. nov.

Monotypica. Descriptio *R. venosi* Pursh.


**Sect. B. Simplices** Rech. f., sect. nov.  
Annui, biennes vel perennes. Caulis simplex ex axillis foliorum infra inflorescentiam ramos foliosos serius elongatos et floriferos non proferens.¹ Rami inflorescentiae singuli vel fasciculati. Valvae ecallosae vel calliferae, integrae vel vario modo dentatae. Folia plana vel crispa, inferiora basi cuneata vel rotundata vel cordata.


Perennes. Folia latitudine 2–4-plo longiora, inferiora in medio circiter latissima, basi leviter cordata vel rotundata vel cuneata. Petiolus supra planus. Valvae rotundato-cordatae, amplae, saepius integrae, una plerumque callifera.—*R. Patientia* L.

¹ Exceptions: (1) If the principal stem is damaged; (2) in overnourished individuals; (3) in some hybrids.

² Several species could not be examined in regard to this character.
Subsect. e.  *Crispi* Rech. f., subsect. nov.  
Perennes. Folia latitudine 3–6-plo longiora, crispa, basi cuneata, in medio circiter latissima. Petiolus supra canaliculatus. Valvae rotundato-cordatae, saepius integrae, omnes vel una callifera. Pedicelli perigonio maturo 1.5–2.5-plo longiores.—*R. crispus* L.


Subsect. g.  *Hydrolapatha* Rech. f., subsect. nov.  
Perennes. Folia basi cuneata, plana acuta, consistentia rigida subcoriacea, longitudine usque 5-plo longiora, nervis secundariis angulo recto vel subrecto a primario abeuntibus. Pedicelli fructiferi rigiduli, perigonio maturo usque 2.5-plo longiores. Valvae omnes calliferae integrae. Calli fusiformes.—*R. Britannica* L.

Subsect. h.  *Obtusifolii* Rech. f., subsect. nov.  
Perennes. Folia basalia basi cordata plana longitudine ca. 2-plo longiora. Pedicelli fructiferi perigonio maturo 1–2.5-plo longiores, in vel infra medium articulati. Valvae una vel omnes calliferae saepius dentatae.—*R. obtusifolius* L., *R. pulcher* L.

Subsect. i.  *Dentati* Rech. f., subsect. nov.  


**GENERAL DISCUSSION OF SECT. AXILLARES**

Among the most important new data regarding the taxonomy of the genus *Rumex* that I obtained while studying the North American species is the genetic connection of the species of *Lapathum* with axillary branching (sect. *Axillares*). Since the section has in North America its principal area of distribution and probably its most
important center of development, this subject may be discussed here in detail.


The habit of the North American *R. venosus*, the South American *R. cuneifolius*, and the New Zealand *R. neglectus*, with widely extended, creeping, rhizome-like stem which emits sooner or later axillary shoots, can no doubt be considered a modification of the axillary type.

The opinion is surely acceptable that all the mentioned species outside America (except *R. sibiricus*, which belongs to subsect. *Salicifolii*) are relics of ancient lines of development. Most of the New World descendants, on the contrary, have partly kept their freshness of life and their power of accommodation. Many of them are in full development and have been able to occupy new land during alterations in distribution of land and water that took place in recent geologic periods, and they are still able to invade and inhabit regions deprived by man of their original vegetation.

The shape of the fruiting perigonium segments exhibits all the possibilities of this genus. The tendency to enlarge the surface is more or less occasionally—even exceedingly—prominent (*R. venosus* Pursh has the largest existing valves). At the same time the nervation is developed very differently, stronger or delicately graduated (*R. venosus*), or in nets of very different shape in the middle and the border of the valves. The midnerve is either not thickened (especially in the species with important development of the surface of the valves) or only little thickened, or it is transformed on one valve or all three to a smaller or larger grain of oblong, globular-ovate, or spindle-like form of the most different nature. Nevertheless the
characteristic shape of the grain and its proportion to the surface of the valve remain in narrow limits for every species.

The *Axillares* show little tendency toward dentation on the margins of the valves; it is developed considerably only in one species, the Australian *R. Brownii*, and in that to an extreme degree. Among the American *Axillares* only *R. californicus* shows small teeth. Some others have now and then weak and irregular notches on the margins of the valves.

The isolated systematic position of the extra-American species as relics of an ancient group or groups, as mentioned above within the *Axillares*, as well as of the South American *R. Lorentzianus* Lindau and the North American *R. venosus*, can be expressed best by making each the representative of a subsection, while the other South American species may be grouped in two subsections (*R. cuneifolius* Campd. and *R. argentinus* in the first; all the other mentioned South American species in the second). Among the North American *Axillares* the species with very long pedicels (*R. verticillatus* L., *R. floridanus* Meisn., *R. fascicularis* Small—Subsect. *Verticillati*) differ clearly from the mass of all the others—Subsect. *Salicifolii*.

Among the *Salicifolii*—which derive their name from the species first described but previously not well interpreted, *R. salicifolius* Weinm.—three species differ from all the others by the size of the valves and by ovate-lanceolate, elegantly cuspidate leaves (*R. spiralis* Small, *R. altissimus* Wood, *R. ellipticus* Greene).

*Rumex lacustris* Greene, confined to Oregon, occupies a separate position because of its aquatic habit and its papillous-pubescent terrestrial form. *R. salicifolius* Weinm. nec al. and *R. crassus* Rech. f., both confined to California, have fruiting perigonia with one valve almost completely covered by an extraordinarily prominent grain. With the first is associated, as a parallel species without grains, *R. californicus* Rech. f., with shallowly dentate valve margins. The New England and eastern Canadian *R. pallidus* Bigel., which reappears in Alaska, has well developed grains, but of an oblong shape, and they do not cover the whole surface of the valves. This species is closely related to the east Siberian *R. sibiricus* Hultén, the only extra-North American representative of the *Salicifolii*. *R. transitorius* Rech. f., indigenous in the northwestern United States, lies morphologically between the Californian species and *R. pallidus*. *R. mexicanus* Meisn., *R. Berlandieri* Meisn., and *R. triangulivalvis* (Danser) Rech. f. have small grains in proportion to the valves; among these three *R. mexicanus* has the largest valves and nutlets and is in
the strict sense, as I understand it here, in contrast to Fernald in 
Rhodora 10: 17. 1908, restricted to Mexico. *R. Berlandieri* also 
inhabits Mexico, besides the southern United States eastward as far 
as Louisiana. Among other features, it is characterized by rather 
small and obtuse, undulate leaves, by scrobiculate, nervose valves 
of compact structure, and by remote whorls. Because *R. Berlandieri* 
was misinterpreted by American authors, especially Trelease, who 
evidently had not seen Meisner's type, the same species has been 
described a second time as *R. Langloisii* Small. I designate as 
*R. triangulivalvis* the form resembling and closely related to *R. mexi-
canus* Meisn. but constantly differing by smaller valves and nutlets, 
which was identified by Fernald (loc. cit.) with *R. mexicanus*. Its 
home is southeastern Canada and the northeastern and middle 
United States. It is apparently the only species of this group that 
has been introduced into Europe. It appears in a scarcely differing 
form in the mountainous western states: var. *oreolapathum* Rech. f. 
This mountain race of *R. triangulivalvis* finds a parallel species with-
out grains in *R. utahensis*.

Thus the numerous species of *Salicifolii* cover the whole North 
American continent except the arctic and subarctic regions and the 
southeast (Florida and adjacent states), and extends northwest to Asia.

Herewith there is given for the first time an essay of a demarca-
tion and general characterization of this peculiar group. There is 
no doubt that the group *Salicifolii* is a natural one; but how far I 
have succeeded in the taxonomic arrangement of species—without 
the field study and cytological investigations essential for such 
critical groups—will become apparent later. The group *Salicifolii* 
does not show any geographic arrangement in the sense that it is 
represented in each region by only one species. In the south as well 
as in the west, several well-differentiated types grow close together. 
This fact could be interpreted as pointing to a great independence 
of these types. If in most cases I have chosen binary names for the 
representatives of the *Salicifolii* it has been not only for that reason, 
but also for practical considerations. In treating polymorphous groups 
I have the conviction that the supposed, mostly plastic or versatile 
parental connection of the various members is better expressed in a 
discussion rather than invested with precipitate, so to speak, assump-
tions that necessarily become on paper complicated clumsy formulae 
of dogmatic character. Yet it can not be denied that when taxonomic 
changes become necessary with the progress of knowledge, binary 
names are easier to handle than more complex ones.
Schematic essays of classification, especially when based exclusively on cultivated material and without any attempt to consider the results of research based on study of wild forms, as those of Danser, Nederl. Kruidk. Arch. 415. 1925, can only be considered as an expedient for the very first phases of systematic inquiry and should never be stated in a taxonomic way.

To friends of the broader limitation of species and of the clumsier nomenclatorial apparatus bound to it I wish to indicate, nevertheless, how some of the species accepted by me could, conceivably, with greater knowledge of them than is available at present, be united to form collective species, and also which species will resist, in my opinion, any condensation, under all circumstances.

*R. spiralis* will remain separated. *R. altissimus* and *R. ellipticus* may well be united. *R. lacustris* will probably remain a separate entity but it may be that it could be connected with *R. hesperius*, with western forms only incompletely understood by me of which I have had only incomplete or inadequate material. I should not be astonished if *R. crassus* were a diploid or multiploid race of *R. salicifolius*. These two species, and perhaps also *R. californicus* as a grainless parallel race of the latter with denticulate valves, could eventually be united. *R. pallidus* and *R. sibiricus* should be united. It remains doubtful whether *R. transitorius* has to be joined with *R. salicifolius-crassus, R. sibiricus-pallidus*, or with *R. mexicanus-triangulivalvis* because of its intermediate position. *R. Berlandieri* will better remain separated. *R. mexicanus* and *R. triangulivalvis*, including var. *oreolapathum*, may be united with *R. utahensis* as a grainless mountain form. On the other hand, *R. utahensis* resembles in some of its forms *R. californicus*; both are grainless and both seem to meet in the Californian mountains and then are not to be distinguished with certainty. As indicated, they seem to be of different origin.

The history of the *Salicifolii* is short. *R. salicifolius* was the first group to be described, and its name was used during a long time for all or at least almost all the species of this group. It was used also by Trelease in this wide sense. Meisner, when establishing *R. mexicanus* and *R. Berlandieri*, seemed not to have a clear conception of their parental position. The name *R. mexicanus* came to connote a special entity by Fernald, as he used it for a form widely spread over the middle, northern, and eastern United States. This form is really closely related to *R. mexicanus* Meisn., but differs by slight, although constant characters in the size of the
valves and nutlets. The name \textit{R. Berlandieri}, on the contrary, has never been used in the correct sense since Meisner's treatment, especially owing to Trelease's misinterpretation of it. Under this name generally has appeared a species of a quite different group (\textit{R. violascens} Rech. f.); in a widely circulated exsiccatum (Pringle), also \textit{R. conglomeratus}. Again the plant named by Meisner was described a second time as \textit{R. Langloisii} Small, but the latter author made a valuable discovery with \textit{R. spiralis}. I have not seen any type specimen of \textit{R. altissimus} Wood, consequently I have used the name as Trelease and most American authors do, although I am not quite convinced that this conception is right.

Danser's classification of the \textit{Salicifolius} group (see above) is based purely on the study of cultivated and introduced plants. He distinguishes two subspecies, ssp. \textit{triangulivalvis} and ssp. \textit{angustivalvis}, and three varieties, var. \textit{trigranis}, var. \textit{unigranis}, and var. \textit{nudivalvis}. Subsp. \textit{triangulivalvis} var. \textit{trigranis} corresponds to the most widespread type and is treated in the present paper as a species. Subsp. \textit{angustivalvis} var. \textit{unigranis} corresponds to \textit{R. salicifolius} Weinm., nec aliorum. Danser's observations on the development of \textit{R. salicifolius} (op. cit. 423) are of special interest and of great influence on the natural arrangement of the genus, viz., (1) \textit{R. salicifolius} does not develop radical leaves; (2) though perennial, it is able to flower in the first year if circumstances are not too unfavorable; (3) it does not go through a resting period after maturity of the principal fruiting panicle, but develops axillary branches below the principal panicle during its ripening. When the second one is ripening, the fruits of the first are falling off, and so on until the frost comes.

**KEY TO SPECIES**

Flowers dioecious or polygamous; leaves hastately lobed (except species 5 and sometimes 6). Subgenera \textit{Acetosa} and \textit{Acetosella}.

Valves rarely enlarged, as large or at most twice as large as the nutlet. Subgenus \textit{Acetosella}.

Leaves short, oblanceolate, hastate, with usually large basal lobes; panicle amply branched; valves very small, not larger than the nutlets, without grain and without distinct nervation. \textbf{1.} \textit{R. Acetosella}.

Leaves narrow, linear, without or with small basal lobes; panicle sparse; valves of nearly double the size of the nutlet. \textbf{2.} \textit{R. graminifolius}. 
Valves enlarged, distinctly overtopping the nutlet. Subgenus *Acetosa*.

Leaves narrowed at the base, never with hastate lobes.

5. *R. paucifolius*.

Leaves with hastate lobes.

Stems robust; leaves usually cordate-obleng; valves about 5 mm. wide (see also 4. *R. thyrsiflorus*). .3. *R. Acetosa*.

Stems slender; leaves narrow, usually variable in shape; valves about 4 mm. wide.................6. *R. hastatulus*.

Flowers usually androgynous; leaves never hastately lobed. Subgenus *Lapathum*.

Stems erect, ascending, or procumbent, with axillary shoots.

Sect. *Axillares*.

Valves wider than 20 mm., grainless, with a fine, double reticulation; ocreae wide, conspicuous................7. *R. venosus*.

Valves much smaller, at most 15 mm. long; ocreae smaller, appressed. Subsect. *Salicifolii*.

Pedicels (2-) 2.5–5 times longer than the fruit.

Stems slender, low; leaves broad and short, at most twice as long as broad, often still shorter, the nerves forming an angle of about 80° with the midnerve.

10. *R. fascicularis*.

Stems tall, robust; leaves at least 3 times longer than broad, the nerves forming an angle of about 45° with the midnerve.

Panicle open; pedicels conspicuous, 3–5 times longer than the fruits, these yellowish; valves rarely as broad as long, or narrower; leaves 5–7 times as long as broad.........................8. *R. verticillatus*.

Panicle rather dense; pedicels relatively inconspicuous, (2-) 2.5–3 times longer than the fruit; ripe fruits dark; valves often broader than long; leaves 3–5 times as long as broad.........................9. *R. floridanus*.

Pedicels at most twice as long as the fruit.

Valves 7–8 mm. long, 8–12 mm. broad........11. *R. spiralis*.

Valves much smaller.

Leaves ovate-lanceolate, broadest below the middle; valves more than 4.5 mm. long.

Leaves usually narrower, lanceolate or linear-lanceolate, but if exceptionally broad, the fruits much smaller. Valves grainless.

Stems slender but rigid, relatively tall, abundantly branched; leaves narrow; fruiting panicle large, open; valves rather distinctly denticulate.

24. R. californicus.

Stems thickish, mostly low, little branched; leaves broader; fruiting panicle small, very compact; valves a little crenulate at the base, nearly entire..................21. R. utahensis.

One valve or all grain-bearing.

Grains occupying nearly the whole breadth of the valve (the margin of the valve is on both sides of the grain narrower than the grain).

Valves relatively large, 4–5 mm. long; leaves 2–3 times longer than broad ......22. R. crassus.

Valves much smaller; leaves narrower.

Valves very small, 2.3–3 mm. long, only one with a grain.............23. R. salicifolius.

Valves larger, all with grains.

Valves 3–4 mm. long, scarcely longer than the grains, yellowish; nutlets about 2.5 mm. long.


Valves 2.5–3 mm. long, distinctly longer than the grains, brownish; nutlets scarcely 2 mm. long.............20. R. sibiricus.

Grains much narrower than the breadth of the valves (the margin of the valve is on both sides of the grain at least as broad as the grain. Compare also 25. R. cuneifolius).

Valves very small, 2.1–2.5 mm. long, with small grains; plants occurring in a broad-leaved, subglabrous, submersed state and in a narrower-leaved, papillate, emersed state.

17. R. lacustris.

Valves usually more than 3 mm. long; plant never living submerged; leaves longer and narrower, never papillate.
Leaves small and thickish, in the dry state olive-green, often undulate, somewhat obtuse, with strongly prominent nerves beneath; panicles interrupted; most whorls remote.


Leaves larger, rather thin, in the dry state pale green, acute; nerves scarcely prominent; fruiting panicle not interrupted, or only in the lower part.

Valves about 4 mm. long; nutlets about 2.5 mm. long ............ 15. *R. mexicanus*.

Valves about 3 mm. long; nutlets about 2 mm. long ............ 16. *R. triangulivalvis*.

Stems usually erect, without axillary shoots.

Valves grainless, at most one of them with a diminutive, globular suggestion of a grain (*R. domesticus*), entire or finely and indistinctly erose-crenulate, rarely finely denticulate (*R. pycnanthus*).

Valves more than 10–16 mm. long; leaves gradually narrowed; ocreae large, persistent ............ 26. *R. hymenosepalus*.

Valves much smaller; ocreae delicate, caducous.

Plants with a vertical root.

Valves broad, rounded, nearly reniform, often broader than long, one sometimes with a diminutive, globular grain; leaves broadest at the middle, at the base abruptly narrowed, occasionally subcordate, the margin mostly undulate ............ 32. *R. domesticus*.

Valves roundish-ovate or cordate, often a little longer than broad, never with a suggestion of a grain.

Stems low; panicle not branched or with few short branches; leaves thickish, mostly narrowed on both sides; valve nerves thickish but indistinct; whole plant often with a purple tinge.

34. *R. arcticus*.

Stems tall; fruiting panicle usually compound; leaves mostly cordate at the base, but their shape most variable; valve nerves fine and distinct.

Valves more than 7 mm. long .... 35. *R. fenestratus*.

Valves to 5 mm. long ............ 33. *R. occidentalis*. 
Plants with a creeping rootstock (compare also 31. *R. alpinus*).

Plants low; all leaves blunt, never more than twice as long as broad......................30. *R. praecox*.

Plants tall; only the earliest leaves, if any, short and blunt, all the others about 3 times longer than broad, pointed.

Lateral leaf nerves forming a right angle with the mid-nerve; valves small, about 4 mm. long.

29. *R. orthoneurus*.

Lateral leaf nerves forming an acute angle with the midnerve; valves larger, 5–6 mm. long.

Valves nearly twice as long as broad, narrow, triangular, very pointed, rather distinctly denticulate near the base.......28. *R. pycnanthus*.

Valves as long as or only a little longer than broad, scutiform, indistinctly crenulate-denticulate to entire......................27. *R. densiflorus*.

At least one valve with a distinct grain.

Valves entire.

Leaves broad, flat, the nerves forming almost a right angle with the midrib; grain oblong, much longer than broad.

40. *R. Britannica*.

Leaves narrower, the nerves forming an acute angle with the midrib; grain ovate-oblong, at most 1.5 times longer than broad.

Leaves small, flat, and truncate; valves very small, scarcely broader than the thick grains; whorls remote, nearly all with leaves (compare also 39. *R. sanguineus*)..................38. *R. conglomeratus*.

Leaves large, somewhat crisped or undulate, often narrowed at the base, seldom truncate; valves large, much broader than the grains; only the lower whorls with leaves and occasionally remote.

Leaves rather narrow, broadest at the middle, mostly much undulate, gradually narrowed to the base; petiole somewhat canaliculate on the upper side; valves (3.5–) 5–6 mm. long (shape of the leaves, the valves, and the number of the grains most variable)..................37. *R. crispus*. 
Leaves broader, often broadest below the middle, suddenly narrowed toward the base, truncate or slightly cordate, less undulate; petiole flat on the upper side; valves larger; grains smaller in proportion to the valves (rare).... 36. *R. Patientia*.

Valves denticulate (compare also 49. *R. bucephalophorus*).

Plants perennial; basal leaves at most 2.5 times longer than broad, cordate at the base.

Leaves small; pedicels long, slender, nearly twice as long as the fruit, articulate at the middle. 42. *R. pulcher*.

Leaves large; pedicels long, slender, nearly twice as long as the fruit, articulate toward the base.

41. *R. obtusifolius* (mostly subsp. *agrestis*).

Plants mostly annual (but sometimes tall and robust); basal leaves 3–6 times longer than broad.

Pedicels thickish; valves shortly dentate; leaves obcordate-lanceolate, mostly widest above the middle, nearly 3 times longer than broad. 44. *R. violascens*.

Pedicels long, slender; valves mostly long-dentate; leaves linear-lanceolate, mostly many times longer than broad.

Valves 3–3.5 mm. long, broad, triangular, relatively short-dentate; grain much narrower than the valve; leaves broad.......... 45. *R. flexicaulis*.

Valves at most 2 mm. long, narrow, triangular or elliptic, little broader than the grain, the teeth generally long, fine, often nearly hair-like (compare also 48. *R. maritimus*).

Valves triangular; grain fusiform, narrowed (length of the teeth very variable).... 46. *R. fueginus*.

Valves ovate; grain thickish, rounded.

47. *R. persicarioides*.

1. *Rumex Acetosella* L.

A low, slender perennial with linear or lanceolate, hastate leaves; valves entire, not enlarged in fruit, not larger than the nutlet, grainless.

SYNONYM: L. Sp. Pl. 338. 1753; Michx. 216. 1803; Pursh 249. 1816; Campderia 122. 1819; Hook. 129. 1840; Meisn. apud DC. 63. 1856; Watson 10. 1880; Macoun 418. 1883; Trelease 46. 1892; Britt.
A weed of European and Asiatic origin, naturalized nearly throughout the world. The subsp. angiocarpus Murb., Beitr. Fl. Südbosn. 46. 1891, is remarkable in the union of the valves and nutlets into a single body. American specimens cited below as only R. Acetosella are mostly staminate or pistillate and in flower, consequently I was unable to decide whether they are the common R. Acetosella or subsp. angiocarpus Murb.

ALASKA: Opening near edge of lake, Fortman Hatchery, Revillagigedó Isl. (Walker 1031, NY, P, Ca; basal leaves only). Sitka and vicinity, abundant about town (Wright 1557, Ca). Sitka (Shaw, P).


ONTARIO: Battersea, Kingston (Fowler, Ca).

QUEBEC: Côte-Nord du golfe St. Laurent, Natashquan, dunes (Marie-Victorin & Rolland-Germain 28554, St; angiocarpus). Cushing (Adrien 1288, St). Mont Oxford, sur un rocher dénudé (Rousseau 25263, St).

MAINE: Birch Island, Attean Pond, Jackman, Somerset Co. (Schweinfurth 574, P; angiocarpus).

MASSACHUSETTS: Amherst (Brooks, Ca). Hanson, field (Morris, Ca).

CONNECTICUT: Norwich (Setchell, Ca; angiocarpus). Berlin (Brandegee, Ca).

MINNESOTA: Zumbrota, Goodland (Ballard, Ca, P; subsp. eu-Acetosella). Itaska Park, headwaters of Mississippi River, along road, and in sand, Clearwater Co. (J. B. Mayer[?] 17, Ca).


ILLINOIS: Morgan Park Ridge (Dixon & Gage 656, Ca). Muncie, roadsides (Gleason).

IOWA: Grinnell, Poweshiek Co. (Suksdorf, P).

INDIANA: Indianapolis, Gladstone Avenue (Friesner 8731, P).

MISSOURI: St. Louis, Forest Park (Eggert, Ca; angiocarpus). Oakwood, Ralls Co. (Davis 4449, Ca).

ARKANSAS: Without locality (Rafinesque, DC).
SOUTH DAKOTA: Black Hills, Whitewood, 1,350 meters (Rydberg, Ca). Creek bottom, Deadwood (Carr 2113, Ca; angiocarpus). Brookings (Thornber, Ca).


NEVADA: Kings Canyon, Ormsby Co., 1,700–2,000 meters (Baker 1202, P, Ca; angiocarpus). Truckee Meadows, Washoe Co., 1,350 meters (Kennedy 3053, St; angiocarpus).

NEW MEXICO: Hunter’s Lodge near junction of Willow and Gilita creeks, Mogollon Mts., 2,550 meters, base of south slope (Goddard 735, Ca).

ARIZONA: Rincon Mts., Manning Camp, 2,370 meters (Blumer 3380, Ca).

CALIFORNIA: Scott River Valley (Gilbert, Ca). Near Laytonville, Mendocino Co. (Davy 5266, Ca). Near Comptche, Mendocino Co.

JAMAICA: Blue Mt. Peak (Orcutt 5534, Ca; angiocarpus, partly).

2. Rumex graminifolius L.


ILLUSTRATION: Trans. Linn. Soc. 10: pl. 10.

DISTRIBUTION: Arctic Europe, Siberia, and America.

Only one American specimen examined: Alaska, Port Clarence, 65° 5' N., 166° W. (Kjellman, St).

As the American specimen is very poor and not fruiting, I completed my description from Murbeck's, loc. cit., and from a Siberian specimen: Prov. Tobolsk, Obskaja Gub. Mys Kamenyi, 68° 30' (Saposchnikov & Nikitina, MW). *R. graminifolius* is similar to certain forms of *R. Acetosella* (f. *integri folius* Wallr. Sched. Crit. 1822; 186), especially as they occur in arctic regions, e.g., in Greenland (Hb. Stockholm). From these forms *R. graminifolius* is distinguishable by the valves, which are nearly twice as long as the nutlets.

3. *Rumex Acetosa* L.

Perennial; stems simple below the panicle; lower leaves ovate or oblong-ovate, 2–4 times longer than broad, deeply cordate at the base, with acute, hastiform or nearly sagittate auricles, somewhat obtuse at the apex; panicle usually small and rather compact, leafless; pedicels about as long as the fruiting perianth, jointed at the middle; outer perianth segments reflexed; valves orbicular, 3.5–5 mm. in diameter, with a small grain near the base.

SYNONYMY: L. Sp. Pl. 337. 1753; Hook. 129. 1840; Meisn. apud DC. 65. 1856; Macoun 417. 1883; Trelease 78. 1892; Britt. & Brown 548. 1896; Gray 357. 1908; Rydb. R. 231. 1922; Rydb. P. 279. 1932.

Widely spread over Europe and Asia and (according to Trelease, op. cit. 79) indigenous in America from “Labrador to Lake Superior, Alaska, and Oregon,” and “introduced from the Old World at a few points in the Northern States, probably as a waif from gardens in which it is sometimes cultivated for its acid foliage.” I saw specimens only from the following localities:

NEWFOUNDLAND: Torbay (Hove 1362, Ch).

ALBERTA: Milk River Bridge, in rich meadows (Macoun 12908, O). Headwaters of Saskatchewan and Athabasca rivers, Brogeon opposite Cotawet Pass (S. Brown 1046, O).

ALASKA: Little Diomede Isl., Behring Strait (Weyer, Stall-McCracken Exped., NY).
OREGON: (E. Hall 442, SL). Silverton, Marion Co. (Howell, P).

4. Rumex thyrsiflorus Fingerhut

Nearly related to R. Acetosa, but differing from that species by the often taller stem, 50–120 cm. high, the leaves 4–12 times as long as broad, the panicle with many short branches and very dense; valves smaller, 2.5–3.3 mm. long. Flowering (in Europe where it is found sometimes in the same places as R. Acetosa) usually two weeks later than the latter. Originally from Europe and Asia; only one American specimen seen.


HAITI: Massif de la Selle, Marigot, Jardins Bois-Pin, near Source-Cresson, roadside, 2,100 meters (Ekman 10053, Wa).

To be expected on the American continent.

5. Rumex paucifolius Nutt. apud Wats. Figure 1

Radix perennis crassa atra fusiformis, saepe collo residuis caulium et petiolorum dilaceratis ± comosa, valde elongata, multiceps, caules floriferos et rosulas foliorum complures interdum permutlos proferens. Caules floriferi stricte erecti (12–) 30 (–60) cm. alti, validi crassiusculi interdum subfistulosi, pallide virides, tenuiter canaliculato-sulcati, internodiis infra inforsecentiam paucis subelongatis. Ochreae albidae vel candidae hyalinae amplae fere infundibiliformes diu persistentes. Folia omnia plana, glabra et laevia, consistantia in vivo ut videtur subcarnosa, in sicco crassiuscule membranacea, colore pallide viridia, nuncam hastata vel auriculata. Folia basalia late lanceolata vel ovato-lanceolata, (3–) 6 (–9) cm. longa, (0.6–) 1.5 (–3) cm. lata, basi apiceque subaequaliter angustata, in medio—raius basin versus—latissima. Nervus medianus crassus, nervi secundarii tenues, angulo ca. 30°–50° a mediano abeuntes. Petiolii foliorum basaliwm crassiusculi, in vivo certe carsoni, laminae longitudinem subaequantes. Folia caulina paucu sursum valde decrescentia, anguste lanceolata, brevis petiolata, acutiuscula vel obtusiuscula. Inflorescentia rufescens, ± anguste paniculata, saepe contracta rarius laxa, subaphylla, interdum ramis inferioribus elongatis crebre subdivaricato-ramosis subcorymbosa, rami flexuosi erecto-patentes, infimi saepe fasciulati et ramosi, superiores singuli et simplices, infimi saepe elongati.
Florum glomeruli aphylli 3–12-flori saepius approximati vel contigui, rarius ± remoti. Pedicelli tenuiter filiformes breves, ± 2 mm. longi, infra medium insensibiliter articulati, perigonio fructifero plerumque breviore. Flores masculi ca. 1.5 mm. longi virescentes vel purpurascences, antherae aureae, ca. 1.2 mm. longae. Flores feminei purpurascentes, stigmatæ flavæ penicillata. Perigonii foliola exteriora anguste lanceolata, ca. 0.8 mm. longa, basibus interiorum appressa. Perigonii folia interiora (valvae) in statu fructifero 2.9–3.8 mm. longa et lata, colore pallide carneo-bruneo, consistentia tenuiter membranacea, margine integra, basi ± anguste et profunde emarginata, apice rotundata, facie tenuissime elevate reticulato-nervosa, nervus medianus ceteris subvalidior plerumque non callifer. Nux matura brunea nitida, 1.2–1.8 mm. longa, 0.8–1 mm. lata, infra medium latissima.


ILLUSTRATION: Trelease 1892, pl. 15 (R. Geyeri).

DISTRIBUTION: Rocky Mountains from Canada to California.


FIG. 1. *Rumex paucifolius* Nutt.

Big Horn Mts., headwaters of Clear Creek and Crazy Woman River (Tweedy 3271, La). Ten Sleep Lakes, Big Horn Co. (Goodding 458, La). Lepee Creek (Willits 281, La). Jenny Lake (Eikenberry 39, Ch).


Big Horn Mts., headwaters of Clear Creek and Crazy Woman River (Tweedy 3271, La). Ten Sleep Lakes, Big Horn Co. (Goodding 458, La). Lepee Creek (Willits 281, La). Jenny Lake (Eikenberry 39, Ch).

COLORADO: Steamboat Springs, Routt Co. (Eastwood, Ca; Osterhout 2779, Wa, La). Subalpine semi-meadows, Rabbit Ear, Larimer Co. (Goodding 1546, NY, Ca; Be).

WASHINGTON: Without locality (Canby 1068, Ca; Vasey 121, Wa; 291, P). Falcon Valley, loose, volcanic soil (Suksdorf, Ca). Wenatchee Mts., Kittitas Co., in small, grassy plots near streams at the summit, 1,800 meters (Elmer 448, P, Wa; Cotton 1129, P).


NEVADA: Upper Corral Creek, Jarbidge, wet slopes, 2,100 meters (Macbride & Nelson 2052, St, Wa).

CALIFORNIA: Willow Creek, Devils Garden (Austin 428, Wa, Ca). Low, flat, wet soil, Big Valley, Lassen Co. (Nutting, Ca). Modoc

The subgeneric character of separated sexes is not always very evident in this species. I frequently have observed rather more polygamous than entirely pistillate individuals, not so rarely completely staminate.

*R. paucifolius* agrees in general habit with *R. Acetosa* L. but is easily distinguished by its ovate-lanceolate, entire, never hastate basal leaves. The plant has usually a very strong, tapering root. The panicle is usually contracted and very dense by reason of the often elongate and frequently branched lower branches.

The variability of *R. paucifolius* is limited. Trelease, loc. cit., remarks: “Sometimes with a very minute, rounded callosity.” I have not observed such a form, which evidently is very rare. Only in the middle and southern parts of the Californian mountains occurs a form, or perhaps a geographical race, deserving separation:

Var. *gracilescens* Rech. f., nov. var.

Caules numerosi, humiles, 15–20 cm. alti, inflorescentia laxa, folia basalia anguste lanceolata.

The specimens belonging to this variety are indicated in the list of specimens examined.

The area of *R. paucifolius* is limited to the mountainous western districts. In the lower southern and southeastern United States it is replaced by *R. hastatulus* Baldwin apud Elliott. In large regions of the United States occur no indigenous species of the subgenus Acetosa.
Explanation of Figure 1.—Rumex paucifolius Nutt.: (a), Montana, Flathead Divide, Jones; one-half natural size; (b), var. gracilescens Rech. f., California, Hall & Babcock 5456; one-half natural size; valves about 4 times natural size, Oregon, Cusick 2651.

6. Rumex hastatulus Baldw. apud Elliott. Figure 2


SYNONYMY: R. hastatulus Muhl. Cat. ed. 2. 37. 1818, nomen; Baldwin apud Elliott, Sketch Bot. Car. & Ga. 416. 1821, descriptio; Trelease 77. 1892; Britt. & Brown 548. 1896; Small 369. 1903; Gray
Fig. 2. *Rumex hastatus* Baldw.
Rumex hastatulus does not vary in form of the fruits but extremely in habit and form of the leaves; but there are no constant combinations of characters nor characters confined to certain regions, so I could not find any basis for distinguishing varieties. Sometimes R. hastatulus is able to flower even in the first year, and then gives, because of the slender roots and the absence of leaf remains of the pre-
ceding year, the impression of an annual plant. Such individuals have usually short, slender stems and narrow leaves and are often somewhat similar to *R. Acetosella* L. Robust individuals sometimes have axillary shoots from the lowest nodes. Specimens without the suggestion of hastate basal lobes on the leaves are very rare, but the length, breadth, and direction of the lobes are extremely variable. Stamineate plants generally have narrower leaves with shorter basal lobes. The root, especially when compared with that of *R. pauci-folius*, is very slender and relatively short, with tiny secondary rootlets. It produces always a single stem; only in luxuriant specimens or if the primary stem is damaged, the stem is branched from the base, giving the impression of a plant with several stems.

The usual interpretation of this species is opposed in one point to Elliott's original description, "Valvae graniferae," for neither Meisner nor Trelease mention a grain-bearing individual, nor have I been able to find any.

As to the name, the *Index Kewensis* cites wrongly *R. hastulatus* Baldwin apud Elliott instead of *R. hastatulus*. The South American *R. hastulatus* Smith in Rees, Cycl. 30: No. 29, 1819, not Baldwin as I cited by error in Vorarb. Rumex Monogr. 3: 4, is, according to *Index Kewensis*, a synonym of *Muhlenbeckia chilensis* Meisn. and has nothing to do with the North American *Rumex* here described.

**Explanation of Figure 2.**—*Rumex hastatulus* Baldw.: (a), Florida, Curtiss 4568; (b), Texas, Drummond 349; (c), North America, Englemann; all one-half natural size. Valves from Curtiss 4568, Florida, 4 times natural size.

7. *Rumex venosus* Pursh. Figure 3, a

Rami inflorescentiae pauci tenues, flexuosi brevissimi, infimus folio suffultus, paniculam parvam contractam formantes. Florum glo-meruli pauciflori foliis suffurcantis omnino carentes, ± approximati, fructificationis tempore contigui. Perigoniorum fructiferorum pedicelli validiusculi deflexi in medio circiter tenuiter articulati, ad basin perigonii breviter infundibuliformi-dilatati, perigonio maturo breviores. Perigonii foliola exteriora lanceolata acuta, ca. 3 mm. longa, in emarginatione foliorum interiorum reflexa. Perigonii folia interiora (valvae) in statu fructiferi ex emarginatione 14–18 mm. longa, 24–30 mm. lata, plana vel leviter undata, basi profunde et anguste emarginata, lobis basalibus sese attingentibus, apice late rotundata vel truncata margine integerrima, consistentia tenuiter membranacea, colore carneo-bruneo, facie tenuiter et creberrime reticulato-nervoso, macula quisque nervaturae primaria iterum crebre reticulato-nervosa. Valvae minime quidem calliferae. Nux matura brunea 5–7 mm. longa, 5–6 mm. lata, basi rotundata, apice acuta supra basin latissima.

SYNONYMY: R. venosus Pursh, Fl. Amer. Sept. 2: 733. 1814; Campdera 131. 1819; Hook. 130. 1840; Meisn. apud DC. 43. 1856; Watson 8. 1880; Macoun 415. 1883; Coulter 317. 1885; Trelase 79. 1892; Britt. & Brown 548. 1896; Piper 225. 1906; Gray 355. 1908; Rydb. R. 231. 1903; Jepson 291. 1923; Tidestrom 160. 1925; Rydb. P. 276. 1932.

ILLUSTRATIONS: Campdera 1819, pl. 2; Hook. 1840, pl. 174; Bot. Jahrb. 15: 270. 1892; Nat. Pflanzenfam. III. 1a: 17. 1892; Trelase 1892, pl. 17; Britt. & Brown 548. 1896.

DISTRIBUTION: Basin of the Saskatchewan River, Canada, and western United States from Washington and Nevada to the Missouri River Basin and Texas.

ALBERTA: Sandy banks, Seven Persons Coulee, Medicine Hat (Macoun 5882, O).

ASSINIBOIA: Sandy banks, Dunmore (Macoun 5883, Wa).

SASKATCHEWAN: Low ground, Swift Current (Macoun 23762, O). Clay bank at 12 Mile Creek near Wood Mountain (Macoun 12910, O). Sandhills near the Qu’Appelle River (Macoun 23763, O). Banks of streams, south of Wood Mountain (Dawson 78762, O).

SOUTH DAKOTA: Bad Lands (Hatcher, Ca). Black Hills, Custer, 1,650 meters (Rydberg 972, Be). Moist draw on prairie near Eastman, Washabaugh Co. (Over 2287, Wa).

NEBRASKA: Minden (Hapeman, P, Ca, MW). Long Pine (Rutter, Wa). Middle Loup River near Thedford, Thomas Co., on railroad
Fig. 3. Valves of (a) *Rumex venosus* Pursh, (b) *R. fascicularis* Small, and (c) *R. spiralis* Small.
bank (Rydberg 1288, Be). American Plains, 41° Lat. (Hall & Harbour 495, MW).

KANSAS: Manhattan (Kellerman, UW, Lu; Gates, Ch). Sandy soil, Riley Co. (Norton 450, UW). Medora (Benke 4278, Ch).

MONTANA: Greycliff, Sweet Grass Co. (Eggleston 7865, Ch, SL). Logan, 1,200 meters, Livingston, 1,500 meters (Blankinship 742, Be; Swingle, P). Upper Missouri, rocky and grassy slopes near the river (?; MW).


UTAH: Salt Lake City, 1,290 meters (Jones 1729, Be, Bu). Ogden, along Southern Pacific Railroad embankments, common (Hall 10870, Ca). Garfield (M. E. Jones, Ca). Kanab (Jones 5284, La, Ca). Abundant in drift sand on pinyon hills, Fayette (Tidestrom 2096, Wa).


NEW MEXICO: (Fendler 758, Ke).

TEXAS: (Reverchon, Wa).


NEVADA: Wadsworth (Grunow, MW). Esmeralda Co., Belleville, open sand (Shockley 223, Ca). North of University, Reno (Thomas, Ca).

CALIFORNIA: Sheridan (Smith, P).

This species is so different from all others that it must be considered as representing a special subsection of the section Axillares. The valves, 24-30 mm. broad when ripe, are the largest known in the whole genus. In this respect *R. venosus* may, within the subgenus *Lapathum*, be compared only with *R. macranthus* Boiss. of western Asia, and within the subgenus *Acetosa* with representatives of the section *Vesicarii* from the southern parts of the Mediterranean Basin. The first is very different from *R. venosus* in the sectional vegetative characters; the last-named group, moreover, in the subgeneric sexual characters.

*Explanation of Figure 3, a.*—Valves of *Rumex venosus* Pursh, 4 times natural size.

8. *Rumex verticillatus* L. Figure 4

Perennis. Caulis erectus 40-100 cm. altus, gracilescens, leviter anguloso-flexuosus, tenuiter sed profunde canaliculatus, saepe purpurascens, ex axillis foliorum vel e radicis collo breves vel elongatos foliosos vel fasciculos foliorum proferens. Ochreae pallide bruneae hyalinae cylindricae ad nodos inferiores usque 5 cm. longae. Folia omnia in sicco tenuiter papyracea, plana, glabra et levia, sub lente tantum minutissime et sparse papilloso-punctata, nervis secun-
dariis leviter curvatis a primario angulo ca. 45°-60° abeuntibus. Folia infima lineari-lanceolata, basi cuneata, apice acuta, latitudine ca. 5-7-plo longiora; petiolus foliorum basalium tertiam circiter partem longitudinis laminae aequans. Folia caulina anguste lineari-lanceolata, latitudine 6-9-plo longiora, utrinque aequaliter fere angustata, plana vel subundata, brevius petiolata; petiolus latitudinem folii circiter aequans. Folia caulina superiore et folia ramealia inferioribus similia sed proportione minora angustiora brevius petiolata. Rami inflorescentiae ± breves tenues flexuosí singuli simplices ± arcuato-divergentes, infimi tantum ex axillis foliorum orientes, paniculam parvam apertam formantes. Florum glomeruli multiflori omnes ± remoti vel superiores approximati, omnes foliis suffulcrantibus carentes. Perigoniorum fructiferorum pedicelli validi rigidi longissimi, prope basin incrassato-articulati ibique deflexi, basin perigonii versus sensim dilatati et sulcato-alati, perigonio maturo 3-5-plo longiores. Perigonii foliola exteriora anguste lineari-lanceolata acuta, ca. 2.5 mm. longa, marginibus interiorum arcte appressa. Perigonii folia interiora (valvae) in statu maturo 4-5 mm. longa, 2.5-4 mm. lata, pallide brunea, tenuiter coriacea, basi rotundato-dilatata, apice in linguam angustum acutum producta, margine integra, facie irregulariter scrobiculato-rugosa vel fere transversaliter calloso-PLICATA plicis irregulariter anastomosantibus, omnia callifera. Calli subaequales angusti valde prominentes, latitudine usque 4-plo longiores, lateraliter ad basin transverse rugosa, eeterum sub lente minutissime cellulosó-punctati. Nux matura brunea ca. 3 mm. longa, ca. 1.8 mm. lata, basi brevius, apice paulo longius acuminata, vix infra medium latissima.

SYNONYMY: *R. verticillatus* L. Sp. Pl. 334. 1753; Michx. 217. 1803; Pursh 248. 1816; Campdera 98. 1819; Meisn. apud DC. 47. 1856; Macoun 416. 1883; Trelease 85. 1892; Britt. & Brown 549. 1896; Small 369. 1903; Gray 356. 1908; Rydb. P. 280. 1932.

ILLUSTRATIONS: Trelease 1892, pl. 23; Britt. & Brown 549. 1896.

DISTRIBUTION: Lower parts of southeastern Canada and the eastern and middle United States.

FIG. 4. *Rumex verticillatus* L.

VERMONT: Banks of Big Otter Creek, swampy places (Morong, NY).

NEW YORK: Ithaca (Rowlee, Wa; Malte, Lu; Muentechler & Bechtel, P). Swampy ground along Grass River, Canton (Phelps 394, Wa). Marshy margin of outlet to Black Lake, Oswegatchie (Phelps 1402, Wa). Without locality (Wright, Bu).

PENNSYLVANIA: (Bernhardi in 1837, Bu; Muhlenberg, St, Mu).

MARYLAND: In swamp, Chesapeake Beach (Tidestrom 1116, Wa).


SOUTH CAROLINA: Shell Creek opposite Port Royal Sound (Harris 2124A, Wa). Moist ditch south of Charleston, Charleston Co. (Moldenke 1211, St). Porcher's Bluff, Christ Church Parish, Charleston Co. (Mears 38, Wa).


OHIO: St. Marys, swamps (A. Wetzstein, Univ. Graz). Cleveland (Krebs, Be). Ohio (Frank, Z).

TENNESSEE: In paludosis ad French Broad River prope La Dandridge (Rugel, MW).


INDIANA: Knox Co. (Spillman 161, P).

IOWA: Moore, in shallow water of ponds (Conard, MW).

ARKANSAS: Big Lakes, Hornersville (Metcalf 640, Wa).

LOUISIANA: Gretna, opposite New Orleans, swampy woods (Ball 338, Wa).

TEXAS: San Felipe (Drummond, Lu). Galveston (Lindheimer, Be). Houston, Harris Co. (Dixon 623, Ch). Without locality (Reverchon, Be).

*R. verticillatus* forms, together with *R. floridanus* Meisn. and *R. fascicularis* Small, a very natural group, the subsection *Verticillati*. *R. verticillatus* and *R. floridanus* are not always easily distinguishable from each other. As to the differential characters, see under the latter species. Perhaps it would be better to reduce *R. floridanus* and *R. fascicularis* to subspecies of *R. verticillatus*.

Explanation of Figure 4.—*Rumex verticillatus* L., about one-half natural size, from *Macoun* 83599, Ontario. Valves 4 times natural size, from *Macoun* 83598.

9. *Rumex floridanus* Meisn. Figure 5

Perennis. Caulis 40–80 cm. altus, firmus subfistulosus, profunde sulcato-canaliculatus, plerumque atropurpureus, iam infra medium ramos foliosos breves serius elongatos floriferos proferens. Ochreae magnae pallidae hyalinae cito evanescentes. Folia omnia in sicco crassiusculae papyracea interdum subcoriacea rigidula, plana, glabra et laevia, sub lente tantum minutissime et sparse punctulata, nervis secundariis leviter curvatis, angulo ± 60° a primario abeuntibus. Folia caulina ad 20 cm. longa, 5 cm. lata, late lanceolata, latitudine 3–5 (–6) -plo longiora, utrinque subaequaliter angustata, plana. Petiolus latitudinem laminae subaequans. Folia caulina superiore et ramealia sensim minora, summa imprimit angustiora. Rami inflor- scentiae breves raro infimi elongati tenues sed tenaces, singuli simplices, infimi tantum folio suffulti, paniculam parvam et contractam formantes. Florum glomeruli multiflori in statu fructifero omnes contigui, infimi interdum paulum remoti, omnes foliis suffulerantibus carentes. Perigoniorum fructiferorum pedicelli validi rigidiusculi prope basin incrassato-articulati, ibique deflexi, basin perigonii versus sensim dilatati et sulcato-alati, perigonio maturo (1.5–) 2 (–3) -plo longiores. Perigonii foliola exteriora anguste lineari-lanceolata basibus interiorum appressa, ca. 2.5 mm. longa. Perigonii folia interiora (valvae) in statu maturo 4–5.5 mm. longa, 4.5–6 mm. lata, longitudine semper evidenter latiora, basi truncata, apice breviter acuminata margine integra facie prominenter reticulato-nervosa, maculis nervaturae marginalibus valde elongatis, color valvarum
fructiferarum atro- vel fusco-bruneus, consistentia rigide coriacea. Valvae omnes calliferae; calli subaequales angusti valde prominentes, 3-4 mm. longi, ca. 1 mm. crassi, plerumque rugulosi. Nux matura atro-brunea, 2.5-3.5 mm. longa, 2-3 mm. lata in vel paulum infra medium latissima, basi breviter, apice sublongius acuminata.

SYNONYMY: R. floridanus Meisn. apud DC. 46. 1856 (non R. floridanus Trelease 86. 1892).

DISTRIBUTION: Eastern and southeastern United States.

NEW JERSEY: Cape May Co., near Wildwood (Pollard, Wa, St). Paterson, above the falls of Passaic River, Passaic Co. (Rabenau, Lu).

DELAWARE: Wet woods near Milton, Sussex Co. (Britton 46, NY).

GEORGIA: Altamaha Grit, Darien, McIntosh Co. (H. H. Smith 2158, MW).


ALABAMA: Borders of ditches, marshes, ponds, muddy banks, etc., Mobile (Mohr, Wa, Be). Cedarpoint (Mohr, Ch).

LOUISIANA: New Orleans (Drummond 280, Lu, Ke; Hitzer[?], UW). Vicinity of Lake Charles (Allison 133, Wa, SL). Along a ditch of saltish water, Côtes Blanches, St. Mary Co. (Langlois, Wa), Mississippi Delta and adjacent islands (Lloyd & Tracy 131, Wa. NY, MW).

Rumex floridanus is very similar to R. verticillatus L. It differs from the latter by the following characters: shorter, broader leaves of somewhat leathery consistency, more robust stem, denser fruiting panicle, shorter fruiting pedicels (being in pressed plants not so conspicuous as in R. verticillatus), valves broader than long, and by the darker color of the whole plant, especially of the fruiting perigonia. The fact that these characters occur in most cases combined, and limited to the southeastern United States, seems to confirm the specific distinction of the two types, even if in some cases one or another of the characters is not so decided.

I have not seen Meisner's type specimen, but there can not be any doubt about the identity of his plant with the one here described. The following remarks from Meisner's description confirm it sufficiently: "Racemis continuis ... demum densis ... pedicellis subduplo
Fig. 5. *Rumex floridanus* Meisn.
longioribus... valvis demum latioribus quam longis... differt a R. verticillato pedicellis brevioribus, valvis basi truncatis distinctius reticulatis."

Trelease, op. cit. 86. pl. 24, describes and figures under the name of R. floridanus a quite different plant (R. Berlandieri Meisn.), as Small, Bull. Torrey Club 23: 405, has already pointed out.

Explanation of Figure 5.—Rumex floridanus Meisn., one-half natural size; Curtiss 4850, Florida. Valves 4 times natural size, from Nash 2286.

10. Rumex fascicularis Small. Figure 3, b

Nux brunea, 2-2.5 mm. longa et lata, marginata, apice breviter acuminata, paulo infra medium latissima, longitudine interdum paulo lator.


*R. fascicularis* is nearly related to *R. verticillatus* L. and *R. floridanus* Meisn. It is similar to these species especially in the pedicels and fruiting perigonia, but differs from both remarkably by the much broader and shorter leaves, these being at most twice as long as wide and slightly cordate at the base, with long petioles, and lateral nerves that form a less acute angle with the midrib, and by the lower and more slender stem. I can not decide whether fusiform-incrassate root fibers form a differential character against *R. verticillatus* and *R. floridanus*, because I had no opportunity to study the subterranean parts of the latter species.

Besides the type number, I saw only one specimen possibly belonging to *R. fascicularis*: Ohio, Middletown (*Riddell, Wa*). In habit it is similar to *R. fascicularis*, but differs from the type by its somewhat narrower leaves, broadly rounded at the base, and by its shorter petioles. The specimen is in these respects an intermediate between *R. fascicularis* and *R. floridanus*.

Explanation of Figure 3, b.—Valves of *Rumex fascicularis* Small, 4 times natural size, from *Nash* 898.

11. *Rumex spiralis* Small. Figure 5, c

Perennis ("rootstock woody, creeping 1-2 dm. long, roots fibrous" ex auctore). Caulis ascendens vel erectus purpurascens tenuis gracilis ± flexuosus, tenuiter sed profunde canaliculato-sulcatus, a basi fere ex axillis foliorum ramos foliosos serios elongatos emitte, 60-90 cm. altus. Ochreae magnae albidae hyalinae cylindericae diu persistentes. Folia in sicco consistentia tenuiter papyracea, colore pallide viridi, basin versus interdum leviter undulato-crispata, ceterum fere plana, utrinque glabra et levia, sub lente tantum minutissime punctulata. Nervi secundarii foliorum tenues, vix arcuatam angulo 50°-60° a primario abeuntes. Folia caulina inferiora ovato-vel oblongo-lanceolata, basi rotundata vel truncata, apicem versus sensim attenuata, 10-15 cm. longa, 3.5-5.5 cm. lata, latitudine 2.5-3.5-plo longiora, in tertia circiter parte inferiore latissima, petiolata.
Petioli latitudinem folii subaequantes. Folia caulina superiora multo angustiora, latitudine 4–6-plo longiora, basi cuneata, apice longius angustata, petioli latitudine laminae ± longior. Rami inflorescentiae tenues flexuosi singuli simplices, angulo 40°–60° ab axi principali divergentes, omnino aphylli, breves, infimi interdum paulum elongati ad 12 cm. longi. Florum glomeruli multiflori, omnes fere approximati, in statu fructifero contigui, folii suffulcrantibus omnino carentes. Perigoniorum fructiferorum pedicelli tenues, (2–) 3–5 mm. longi, in vel infra medium incrassato-articulati, ad basin perigonii nodoso-incrassati, perigonio fructiferio semper multo breviores. Perigonii foliola exteriora anguste lanceolato-linearia, ca. 2.5 mm. longa. Perigonii folia intermedia (valvae) in statu fructifero ex emarginatione 7–8 mm. longa, 8–12 mm. lata, longitudine semper latiora, basi profunde emarginata, apice acuminata, ambitu late cordata, margine integra, facie prominenter pulchre subregulariter reticulato-nervosa, consistentia coriaceo-membranacea, colore pallide rufo-brunea. Valvae omnes calliferae, callus valde prominens, anguste fusiformis, ca. 5 mm. longus, ca. 1–1.3 mm. crassus, in nervum medianum valvae sensim transiens, rugulosus. Nux matura atro-fusca ad angulos anguste pallide marginata, 3 mm. longa, ± 2.2 mm. lata, basi fere rotundato-truncata, apice breviter acuminata, infra medium latissima.


TEXAS: Kenedy, Karnes Co., 120 meters (Heller 1781, Ca, Wa, Ke; no fr., type). San Antonio, edge of lake (Schultz 151, Wa; the leaves narrow, 5 times as long as broad).

This species has the largest fruiting perigonia and the largest nutlets of the subsection Salicifolii and may be recognized easily by these characters. R. spiralis is, so far as known, strictly limited to Texas, and seems to be a rare plant.

Explanation of Figure 3, c.—Valves of Rumex spiralis Small, 4 times natural size, from Heller 1781, Texas.

12. Rumex altissimus Wood. Figure 6

Perennis. Caulis erectus ad 80 cm. altus validus subfistulosus flexuosus vel strictus, plerumque atropurpureus, profunde sulcato-canaliculatus, a medio vel infra ramos foliosos serius valde elongatos et floriferos emitte. Ochreae magnae albidae hyalinae evanescentes. Folia omnia in sicco colore pallide virenti, consistentia
rigide papyracea, plana, glabra et laevia, sub lente tantum minutissime punctulata, nervis secundariis tenuibus vix curvatis angulo ca. 50–60° a primario abeuntibus. Folia caulina inferiora late vel ovato-lanceolata vel oblongo-lanceolata, 12–18 cm. longa, 4–5.5 cm. lata, latitudine 2.5–4-plo longiora, infra medium latissima, basi late cuneata vel subrotundata, apice sensim angustata, petioluta. Petioli dimidia latitudine folii breviore. Folia caulina superiorea et folia ramealia minora brevius petioluta, basi angustius cuneata, apice brevius acuminata. Kami inflorescentiae breves singuli simplices, rarius inferiores elongati iterum ramosi, angle 45° ab axi principali divergentes, leviter arcuati, subflexuosi, infimi tantum foliis suffulti, paniculam apertam formantes. Florum glomeruli multiflori, in statu fructifer o plerumque contigui, rarius infimi remoti, omnes foliis suffulerantibus carentes. Perigoniorum fructiferorum pedicelli validiusculi, in quarta circiter parte inferiore incrassato-articulati, ad basin perigonii subito paulum dilatati, perigonio fructifero subbreviore vel subaequilongi, rare paulo longiores. Perigonii foliola exteriora anguste lanceolata acutiuscula dimidiam latitudinem valvae subaequalibus marginalibus vix elongatis. Color valvarum maturarum olivaceo-bruneus, consistencia tenuiter rigide coriacea. Valva unica vel omnes saepe valde inaequaliter calliferae. Callus ovato-fusiformis valde prominens ± 3 mm. longus, ± 1 mm. crassus laevis vel subrugosus, bruno-aurantiacus. Nux matura atrofusca ca. 3 mm. longa, ca. 2 mm. lata, basi breviter, apice sublongius acuminata, vix infra medium latissima.


**ILLUSTRATIONS:** Trelease, 1892, pl. 25; Britt. & Brown 549. 1896.

**DISTRIBUTION:** Lower parts of the eastern and middle United States to Arizona.

**NEW HAMPSHIRE:** Shelburne, border of wet field, roadside (*Deane, Wa*).
NEW YORK: Along abandoned railway to marble quarry, Gouverneur (Phelps 1144, Wa; 3 grains).

Pennsylvania: York Furnace (Britton, MW; no ripe fr.). Meadville, Crawford Co. (Garber, Wa).

NEW JERSEY: Passaic (Ruth, Wa; no ripe fr.).

MARYLAND AND DISTRICT OF COLUMBIA: Washington, D. C., alluvial ground (Steele 22, UW; no ripe fr.). Canal bank above Chain Bridge (Maxon & Standley 345, Wa; no ripe fr.). River flats near Glen Echo (House 832, Wa; no ripe fr.). On flats at mouth of Scotts River (Holm, St). High Island, Potomac, Montgomery Co. (J. D. Smith, Wa).

VIRGINIA: Virginia side of Potomac River from opposite Analostan Island to Chain Bridge (E. L. Morris 67, Wa; no ripe fr.). Wet places, Little Falls of Potomac River (C. Mohr, Wa; 3 grains).

WEST VIRGINIA: Sandy shores of Ohio River near Wheeling (Mertz, Wa).

GEORGIA: Augusta (Cuthbert, NY; 3 grains).

MICHIGAN: Bryant's, Cheboygan Co. (Gates 10533, Ch; 3 grains).

INDIANA: Pine (Duesner, Ch; no ripe fr.). Dune region (Peattie 2283, Ch). Miller (Mason Bross, Ch).


ALABAMA: Mobile, marshes (C. Mohr, SL; no ripe fr.). Mobile, border of swamp and ditch (C. Mohr, Wa).

WISCONSIN: Fort Howard, Brown Co., in moist or wet clay (Schuette, Ca, Ch, MW). Grant Co. (Hasse, Ca; no ripe fr.). Mazomanie (Hall, Ca).

MINNESOTA: Vicinity of Minneapolis, roadsides (Sandberg Exch. Bur., Ca; 3 grains). Fort Snelling (Mearns 830, Wa; 3 grains). Minneapolis, wayside (Aiton, Ca; 3 grains).


MISSOURI: St. Louis (Engelmann, Be, H; 3 grains). St. Louis, wet places (Eggert, Wa; 3 grains). St. Louis, waste ground (Trelease, Ko; 3 grains). Low grounds east of Missouri Bot. Garden, St. Louis (Douglas, Lu; no ripe fr.). St. Louis, bords des ruisseaux (Riehl 397, MW, Be; no ripe fr.). Am Mississippi (Eggert 293, Be, Bu, Z). Courtney, bottoms (Bush 541, 9773A, Ke, Be). Vicinity of Springfield, along the Jordan, east of town (Standley 9717, Wa; no ripe fr.). Vicinity of Springfield, southeast of town (Standley 8347, Wa; no ripe fr.). Independence (Bush 8, Ca). Allenton (Letterman, Ca; no ripe fr.).

LOUISIANA: Near New Orleans (Matthes 307, MW; no ripe fr.).

NEBRASKA: Ponca (Clements 2544, Wa; no ripe fr.). Lancaster Co. (Milligan, Wa).

KANSAS: Miami Co., along road between Olathe and Pleasanton (Rydberg & Imler 55, NY). Low ground, Riley Co. (Norton 451, MW). One mile northeast of Montana (Rydberg & Imler, NY). Five miles from Osborne City, draw bottom (Shear 86, Wa).

OKLAHOMA: Beaver Co., Knowles, margin of shallow pond (G. W. Stevens 517, Wa, Ke; no ripe fr.). Stillwater (Waugh 141, Wa; C. M. Morris, Univ. Graz; Myers 61, Lu). Mannsville, Johnston Co., margin of pond (Florence Griffith 3459, G; no ripe fr.). Norman (Reed, Z; no ripe fr.).

TEXAS: Tarrant Co., low, damp ground near Texas Christian Univ. (Ruth 604, NY, Ca). Bed of dry stream, Fort Worth (Ruth 123, NY, Wa). Wet, open ground, Bryan, Brazos Co. (Palmer 11788, SL, La, Ca, MW, Br). Wet places near Comanche (Eggert, SL; no ripe fr.). Wet places near Longview (Eggert, SL; no ripe fr.). Sonora, 660 meters (G. L. Fisher 2330, MW). Willis, waste places (S. R. Warner, SL; no ripe fr.). Dallas, damp, rich soil (Reverchon 796, SL); and in upland, common (Reverchon 2523, SL; no ripe fr.). Fort Worth (Ruth 41, Ch). Texline (Griffiths 5634, Wa). Valley,
Gillespie Co. (G. Jermy 740, SL; leaves only). Without locality (Thompson, SL).

COLORADO: Foothills near Golden, 950 meters (Jones 270, Bu; no ripe fr.).

NEW MEXICO: Mangas Springs, 18 miles northwest of Silver City, Grant Co., 1,430 meters (Metcalf 775, La, Wa). Santa Rosa, 1,400 meters (Arsène 17027, MW).

ARIZONA: Benson (Peebles & Loomis 5452, Wa; no ripe fr.). Rincon Mts. (Toumey 280, NY).

INTRODUCED TO EUROPE: Denmark: Kjobenhavn, Plodsved Island Brygge (S. Andersen, Ko).—Sweden: Småland, Kalmar (Ekstrand, St). Göteborg, Gamlestaden (H. Fries, St).

*Rumex altissimus* can be distinguished at once from *R. mexicanus* Meisn. by its broadly ovate (never linear) -lanceolate, elegantly acuminate leaves, recalling those of certain species of *Polygonum*, and by its larger fruiting perigonium segments with elliptic-cordate (never triangular) outline, usually bearing only one grain.

The most common type of *R. altissimus* has fruiting perigonia with only one segment bearing a grain, the others being naked. This corresponds with Wood’s description of *R. altissimus*: “sepalis . . . una vel duabus tuberculatis.” The var. *abortivus* Peattie, Amer. Midl. Nat. 10: 130. 1926, coincides therefore with the type. Specimens with fruiting perigonia bearing three grains are much rarer; the grains are then of very unequal size. Individuals with three equal grains are very rare.

I have not seen the type of *R. altissimus* Wood and accept here the usual interpretation of this species by Trelease and subsequent authors. But I must call attention to the following parts of Wood’s description: “Foliis anguste lanceolatis . . . utrinque angustatis,” which seems to make this interpretation doubtful. Earlier authors seem to have confounded this species with *R. Britannica* L. I suspect that Campdera (99. 1819) may have described it under *R. Claytonii*, but unfortunately I have failed to see Campdera’s types.

*Explanation of Figure 6.*—*Rumex altissimus* Wood, about half natural size; cultivated at Stockholm, from seeds from the District of Columbia, Holm. Valves 4 times natural size, from Crampton 373.

13. *Rumex ellipticus* Greene. Figure 7

Perennis. Caulis procumbens vel adscendens, tenuis sed firmus, internodiis brevibus, valde flexuosus, tenuiter sulcato-striatus, pur-
purascens, a basi crebre iteratim ramosus. Rami valde flexuosi saepe elongati steriles vel serius florentes. Ochreae maiusculae pallide bruneae caducae. Folia caulina et ramealia lanceolata vel late lanceolata, plana, in sicco rigidula tenuiter coriacea, nervis laterali-bus angulo 45°-60° a mediano abeuntibus, angustissime scariosomarginata, basi cuneata, apice longe acuminata, latitudine 3–4-plo longiora, in vel infra medium latissima, petiolo latitudinem folii circiter aequante. Folia superiora sensim minora et angustiora lineari-lanceolata brevius petiolata. Kami inflorescentiae brevissimi, infimi folio suffulti divergentes et paulum remoti, superiores approximati paniculam parvam valde abbreviatam saepe compactam aphyllam formantes. Florum glomeruli omnes approximati aphyllli, iam in statu florendi contigui. Perigoniorum fructiferorum pedicellii validiusculi perbreves, perigonio maturato semper breviores, prope basin articulati, in basin perigonii breviter incrassati. Perigonii foliola exteriora lanceolato-linearia, 2–2.5 mm. longa, basibus interiorum appressa. Perigonii folia interiora (valvae) in statu maturato 5–6 mm. longa, 4–5 mm. lata, ovata vel rotundato-triangularia, margine subintegra, apice obtusiuscula vel acutiuscula, facie tenuiter et subaequaliter reticulato-nervosa nervis marginem versus subeva-nescentibus. Valvae consistencia tenuiter membranacea omnino ecallosae vel unica callum elongatum angustissimum proferens. Nux submatura ad 3 mm. longa, ad 2 mm. lata.


DISTRIBUTION: Texas, New Mexico, and Arizona.


NEW MEXICO: Roswell, Chaves Co., fields and ditch banks, common, 1,140 meters (*Earle* 272, Wa, NY, Ke, Be, MW; type). Mangas Valley (*Wooton*, Wa; midrib of the valves somewhat thickened nearly its whole length). Near Lake Arthur (*Wooton*, Wa; see remarks under the preceding).

ARIZONA: Tucson (*Toumey* 343a, Wa; no fr.). Devil’s Canyon (*Peebles*, Harrison & Kearney 4432, Wa; see remarks above).

*Rumex ellipticus* is very nearly related to *R. altissimus* Wood, with which it probably could be united as a subspecies. It differs,
however, by the usually shorter and more slender, sometimes pro-cumbent stem, frequently smaller leaves, and, especially, by having the fruiting perigonium without grains. Sometimes one valve shows a midnerve somewhat thickened for nearly its whole length, but not grain-bearing. Perhaps such forms should be considered as intermediates between the two species. The area of *R. ellipticus* covers the most southern part of the area of *R. altissimus*.

Explanation of Figure 7.—*Rumex ellipticus* Greene, half natural size; New Mexico, Earle 272. Valves 4 times natural size, from Earle 272.

14. *Rumex Berlandieri* Meisn. nec al. Figure 8

Perennis. Caulis humilis, 40–60 cm. altus, gracilis, adscendens vel subereectus vel flexuosus, bruneus vel purpurascens, tenuiter sulcato-striatus, ochreis albidis membranaceais caducis, initio subsimplex, deinde e nodis mediis vel inferioribus ramos foliosos erecto-patulos seriis florentes emittens. Folia caulina ut tota planta glaberrima et levia, in sicco crasse membranacea vel subcoriacea, ambitu lineari-lanceolata vel oblongo-linearia, inferiora basi rotundata vel subito cuneato-contracta, superiora cuneata apice obtusiuscula margine eroso-crenulata et crispata; nervi secundarii foliorum angulo ± 45° a primario abeuntes. Petiolus foliorum inferiorum crassiusculus, latitudinem laminae superans, superiorum laminae latitudo plerumque brevior. Folia parva, 5–12 cm. longa, latitudine 3.5–5-plo longiora in medio circiter latissima. Florum glomeruli etiam in statu fructifero summis tantum exceptis remoti omnes foliis non suffulti. Rami inflorescentiae primariae singuli simplices, breves, flexuosi, ab axi principali angulo ± 45° abeuntes, leviter arcuato-adscendentes, paniculam parvam apertam formantes. Perigoniorum fructiferorum pedicellus validus deflexus breves, infra medium incrassato-articulati, valvae longitudine plerumque brevi-orae vel eam ad summum aequantes, ad basin perigonii nodoso-incrassati. Perigonii foliola exteriora anguste lanceolata acuta, basibus interiorum adpressa, ca. 2 mm. longa. Perigonii folia interiora (valvae) in statu fructifero 3.5–4.5 mm. longa, 3–4 mm. lata, triangularia vel rotundato-triangularia, apice paulum protrahacta acuta, consistentia subcoriacea, basi truncata rarius levisse cordata, facie crassiuscula et prominenter reticulato-nervosa, reticulo subaequali, margine integra. Valvae omnes subaequaliter callifiereae; callus anguste fusiformis valde prominens ± serobiculato-rugosus ca. 3 mm. longus, ca. 1 mm. latus. Nux atrofusca, 2.5–3 mm. longa, 1.5–2 mm. lata, vix infra medium latissima.
Fig. 8. *Rumex Berlandieri* Meisn.

ILLUSTRATIONS: Trelease 1892, pl. 27 (only the habit), pl. 24 (*R. floridanus*).

DISTRIBUTION: Louisiana, Texas, Mexico.


MEXICO: Veracruz (*Galeotti* 475, Ke, MW; no fr.). Vicinity of Tampico, Tamaulipas, 15 meters (*Palmer* 12, NY, Wa; no fr.). Michoacán, Loma Santa María, in humidis (*Arsène*, Z; no fr.). De Bejar a la Billo de ... (*Berlandier* 419, 1699 in 1828, Ke). Without locality (*Berlandier* 115, Be; type of *R. Berlandieri* Meisn.).

I have compared Meisner's and Small's types, and there are no differences between them. Small was misled in creating his *R. Langloisii* by Trelease's wrong interpretation of *R. Berlandieri* Meisn. Most of the plants referred by Trelease to *R. Berlandieri* belong to *R. violascens* Rech. f., an annual or biennial plant without regular axillary branches, with leaves usually broadest above the middle, and much smaller, denticulate perigonia, smaller nutlets, etc. Some collectors have distributed specimens of *R. conglomeratus* and *R. pulcher* under the name *R. Berlandieri*. Trelease's misinterpretation of *R. floridanus* Meisn. has already been corrected by Small, Bull. Torrey Club, loc. cit.

*R. Berlandieri* is to be compared with *R. mexicanus* Meisn. It is distinguished from the latter by the somewhat dull or yellowish
color when dry, by the short, subobtuse, often crisp leaves of thicker consistency with nervation somewhat prominent on the under side, by the smaller, interrupted panicle with remote whorls, by the different size and outline of the valves with more pronounced, scrobiculate reticulation, and by the different form of the nutlets.

It may be remarked that *R. Berlandieri* is very similar to the cultivated specimen of *R. chrysocarpus* Moris, Enum. Sem. Hort. Bot. Taurin. anni 1831; Mem. Reale Acad. Sci. Torino 38: 46. 1835, which I mentioned in Vorarbeiten 3: 27. That is possibly the earlier name for Meisner’s plant. Moris notes Chile as the country of origin, but Meisner apud DC. 46. 1856, states: “Patria ignota, verisimiliter Mexico aut Chili.” As I have not seen a spontaneous specimen of *R. chrysocarpus* from Chile in any herbarium, it seems probable that it is native to Mexico rather than Chile. Yet as long as I am unable to place definitely the type of *R. chrysocarpus*, it seems preferable to retain the name *R. Berlandieri* for the North American plant.

**Explanation of Figure 8.**—*Rumex Berlandieri* Meisn., half natural size, Texas, Jermy. Valves 4 times natural size, from McAtee 1950.

**15. Rumex mexicanus** Meisn. Figure 9, a

Perigonii folia interiora (valvae) in statu maturo 4-5 mm. longa, 3.7-4 mm. lata, ambitu late triangularia, angulis basalis sub-
dilatatis rotundatis, consistens rigide membranacea subcoriacea, 
colore obscure vel olivaceo-bruneo, basi truncata vel subcordata, 
apice obtusiuscula vel acutiuscula, margine integra vel saepius 
imprimis basin versus minutissime et irregulariter crenulata vel 
erosula, facie regulariter elevate reticulato-nervosa, nervatura in 
utoque latere calli tres usque quattuor maculas lata. Valvae 
omnes subaequaliter calliferae; callus anguste fusiformis valde pro-
imens, basi rotundatus, apice acutus 2.5-3 mm. longus, ad summum 
1 mm. latus, valvae latitudine semper multo angustior, saepi leviter 
scrobiculato-rugosus. Nux atrofusca fere nigra ± 2.5 mm. longa, 
1.7 mm. lata, infra medium latissima, basi breviter, apice sub-
longius acuminata.

SYNONYMY: R. mexicanus Meisn. apud DC. 45. 1856.

DISTRIBUTION: Mexico and New Mexico.

NEW MEXICO: Las Cruces, Dona Ana Co., 1,170 meters (Wooton 
79, SL). Magdalena (Herrick 611, Wa). Navajo Indian Reserva-
tion, Shiprock Agency, 1,425 meters (Standley 7196, Wa).

MEXICO: Chihuahua (Stearns 19, Ch). Chihuahua, near Colonia 
García in the Sierra Madre, 2,280 meters (Townsend & Barber 261, 
Wa, Ca, Z, UW, Be, St). Durango and vicinity (Palmer 17, Wa; 
Ca, no fr.; Ke; Be, no fr.). Vicinity of Morelia, Michoacán, jardin 
du St. Coeur, 1,950 meters (Arsène 3335, Wa, NY, St, G, Ke; all of 
Region of San Luis Potosí, 1,800-2,400 meters (Parry & Palmer 794, 
Ke; no fr.). San Luis Potosí, in paludosis ca. urbem (Schaffner 
904, 906, Ke). Bord de l’Atoyac, près de Puebla (Nicolás, Wa, Ke; no 
fr.). Vicinity of Puebla, Rancho Posada, Puebla (Arsène 87, Wa, 
Mu; no fr.). Vicinity of Puebla, près du Cimetière, 2,170 meters 
(Arsène 2225, Wa, H; slender habit). Near Plateado, Zacatecas 
(Rose 2787, Wa, NY). Federal District, wet soil, Valley of Mexico, 
2,190 meters (Pringle 6716, Ca, Wa, St, Be, H, Mu, Le, MW, UW; 
9487, Wa, Z). Hidalgo, Sierra de Pachuca (Rose & Hay 6243, Wa; 
no fr.). Desierto de los Leones (Ruttem 277, Ut; no fr.). In arvis 
prope León (Pl. Hartweg. 1619, Lu; no fr.). Sonora Alta (Couter 
1388, Ke). Amecameca, 2,430 meters (Fisher 241, Ch, Wa). Con-
tadero (Lyonnet 529, Wa). Chinantla (Liebmann 698g, Ko; without 
grains). Mineral del Monte, Hidalgo (Ehrenberg 41; type of R. 
mexicanus Meisn.). Parras (Orcutt 3801, Ch, Wa). Mt. Orizaba 
(Seaton 270, Wa). Toluca and vicinity (Wawra 1190, WM). San
Fig. 9. Valves of (a) *Rumex mexicanus* Meisn., (b) *R. hymenosepalus* Torr., (c) *R. densiflorus* Osterh., (d) *R. pycnanthus* Rech. f., (e) *R. occidentalis* Wats.
Esteban Tacuba, D. F. (L. G. Ruiz 19, Ch, Wa; no fr.). "Tierra fría" (Schiede 90, Be, type of R. mexicanus Meisn.; Lu). Without locality (Schmitz 284, MW; Schaffner, Be, no fr.; Ke).

The name R. mexicanus is used here in the original, that is to say, in the strict, sense of Meisner. Fernald in Rhodora 10: 17. 1908, used it in a more ample sense, including all the plants placed here under R. triangulivalvis. The two species are, of course, nearly related. The differences are relative and lie in the size of the fruiting perigonia and the nutlets. The reason that I have not united this to the type as a subspecies of R. mexicanus is rather a practical one. American botanists and especially geobotanists may appreciate having a simple binary name for the common "white dock." See also under R. triangulivalvis.

R. mexicanus has partly the same area as R. Berlandieri Meisn., but does not extend so far north and east. As to the differences between these two species, see under R. Berlandieri; between R. mexicanus and R. altissimus Wood, see under the latter.

Explanation of Figure 9, a.—Rumex mexicanus Meisn., valves 4 times natural size, Mexico, Schiede.

16. Rumex triangulivalvis (Danser) Rech. f. Figure 10

Fig. 10. *Rumex triangulivalvis* (Dans.) Rech. f.
breviores ad summum eo 1.5-plo longiores. Perigonii foliola exteri 1.6–1.8 mm. longa. Perigonii folia interiora (valvae) in statu fructifero (1–) 3 (–4) mm. longa, 2.5–3 mm. lata, consistetia rigide membranacea, colore pallide bruneo, ambitu triangularia, angulis basali- bus rotundatis, basi subcordata vel truncata, apice acutiuscula, margine integra vel saepeius basin versus minute irregulariter crenulata, facie subregulariter elevate reticulato-nervosa reticulato-rugosus. Valvae plerumque omnes subaequaliter calliferae raro 1-2 calli evanescentes (f. unigra- nis [Dans.] Rech. f.) vel deficientes; callus anguste fusiformis promi- nens, basi rotundatus apice acutus, 1.8–2.5 mm. longus, 0.6–0.9 mm. latus, valvae latitudine semper multo angustior, saepe leviter scrobicu- lato-rugosus. Nux 2 mm. longa, ± 1.3 mm. lata, atrofusca fere nigra, infra medium latissima, basi breviter acuminata. 


ILLUSTRATIONS: Danser, loc. cit; Trelease 1892, pl. 26 (R. salici- folius); Britt. & Brown 549. 1896 (R. salicifolius).

QUEBEC: Labrador, Saguenay Co., sandy shore, Romaine, Lor- gondière (St. John 90400, O). Environs de Montréal, Longueuil, chemin de Boucheville (Marie-Victorin 25029, St). Environs de Montréal, Boucheville, île Charron (Marie-Victorin 27225, St; no fr.). Grèves de St. Laurent de l’Île d’Orléans (Marie-Victorin 15769 bis, Lu; no fr.). Vicinity of Ottawa, Deschênes (Rolland, Ch, Wa).

ONTARIO: Ottawa (Macoun 5379, Ch; 5878, O; Harrington 356–8, O). Timmins (Ostenfeld 261, Ko). Grant Point, Nipigon Lake (Pulling, O; no fr.). English River (Richardson 23758, O). Moose Factory, James Bay (? , 62613, O; no fr.).

MANITOBA: Selkirk (Macoun 23752, O; no fr.). In ditches and boggy places, Brandon (Macoun 12916, O). Winnipeg (Magnus, H).

SASKATCHEWAN: Damp places, Cypress Hills (Macoun 5880, O; 1533, Wa). By a dry pool, Moose Jaw (Macoun 12855, O; no fr.). South of Wood Mountain (Dawson 78763, O). Lake Manitou, along the line of Grand Trunk Railway (Macoun & Herriot 76815, O). Moose Mt. Creek (Macoun 23751, O; no fr.). South of Battle-
ford, borders of salt marshes (*Macoun* 23753, O). Without locality (*Bourgeau*, MW, St).

**Alberta:** At camp in Crook Flat, sage bank (*Macoun* 12917, O). Boggy ground, Bow River, Calgary (*Moodie*, Wa; no fr.). Craigmyle (*Brinkman* 868, Ch).


**Maine:** On wharf, Bangor (*Knight*, St).

**Massachusetts:** A single large clump in waste ground by railroad, Southbridge (*Weatherby*, Wa).

**New York:** Orient Point, Suffolk Co. (*Latham*, NY; no fr.).

**Ohio:** Without locality (*Frank* in 1837, H, Z).


**Wisconsin:** Shore between Point Sable and Red Banks, Brown Co. (*Schuette* 104, Ca).

**Minnesota:** Twin Lakes, Dakota Co. (*Mearns* 827, Wa).

**Missouri:** St. Louis (*Engelmann*, Be; no fr.).


**South Dakota:** Brookings (*Thornber*, Ca). Aberdeen (*Griffith*, Be; no fr.). Vicinity of Redfield, Spink Co., swampy, saline ground (*Ricksecker* 91, Ca; leaves only).

**Montana:** Westby (*E. L. Larsen* 152, SL). Vicinity of Glacier Park Station, alt. 1,440–1,530 meters, low prairie (*Standley* 17772, Wa). Helena (*Kelsey*, Ca; no fr.). Great Falls (? Ca; no fr.).


NEW MEXICO: College Farm, Mesilla Park (P. C. Standley, Wa, SL; appr. or.). Santa Fe, 2,160 meters (A. A. & E. G. Heller 3745, SL; or.). Santa Fe, along ditch (Fendler, SL; no fr.). Patterson (Wooton, Wa). Rio San Jose (H. H. Rusby, SL). Sandbars, Navajo Indian Reservation, vicinity of Shiprock Agency, 1,425 meters (Standley 7878, Wa; appr. or.). Along creek, Brazos Canyon, Rio Arriba Co. (Standley & Bollman 11128, Wa; appr. or.). Open slope, vicinity of Chama, Rio Arriba Co., 2,380 meters (Standley 6607, Wa; or.; no fr.). Chama (Baker 298, SL). Gila (Wooton, Lu; no fr.). Las Crucas, Dona Ana Co., 1,170 meters (Wooton 79, Ca, UW; appr. or.). Mesilla Valley, Dona Ana Co. (Wooton & Standley 3275, P).

WASHINGTON: Grant Co., moist meadow, Grand Coulee (Thompson 9138, SL; or.). Pullman (Piper, P). Glacier Basin Trail, 1,500 meters. Mt. Rainier (Jones, P). Grand Coulee, Grant Co. (St. John 7672, P). Wilson Creek, Douglas Co. (Sandberg & Leiberg 329, P; Lake & Hull 651, P; both specimens with valves narrower and more pointed).

OREGON: Shore of Klamath Lake, near Modoc Point (Coville 1335, Wa; or.). East side of Klamath marsh (Coville 1247, Wa; or.). Near Fort Klamath, 1,410 meters (Leiberg, SL; or.). Eastern Grant Co., small, dried pond, Austin (Henderson 5651, SL; or.). Along ditches, Redmond (Whited 102, Ke; or.). Cache Bar, between Cache and Garden creeks on Snake River, 380 meters (E. P. Sheldon 8838, SL; or.). Crooked River, Smith Rock, Deschutes Co. (Whited 415, P; not typical). Margin of Strawberry Lake, Blue Mts., Grant Co. (Cusick 3621; not typical). Sauvies Island (Howell, P; valves narrower and more pointed). Hayden Island (Gorman 4204, P). Without locality (Elihu Hall 441, SL; or.).


NEVADA: L—— River Crossing (Griffiths & Morris 121, Wa; or.).
Utah: Fairview, 1,950 meters (Jones 5554i, Wa; or.). Morgan Co. (Garrett 6327, MW; or.). Juab, creek bottoms (Goodding 1072, SL; or.). Soldiers Summit (Jones, Ca; or.; no fr.). Kyune, 1,800 meters, in gravel (Jones 56031, SL; or.). Snyderville, Summit Co. (Garrett 6779, Ch; or.). Dry Lake, Cache Co. (Garrett 6479, Ch; or.).

Arizona: Bellemont (Jones 4075, Ca). Fort Valley, 2,175 meters, Coconino National Forest and vicinity (Pearson 214, Wa; appr. or.). Williams (Greene, Ch). Walnut Canyon, 1,500 meters (Leiberg 5781, Wa). Grand Canyon (Millspaugh 134, Ch).

California: Butte Co., meadows at Butte, in the Canadian Zone (Heller 14072, Wa; or.). Alpine Co., Carson Spur, 2,550 meters (Hansen 752, Ca; or.; no fr.). Alpine Co., Kirkwood, 2,550 meters (Hansen 752, SL, UW; or.; no fr.).

Sweden: Göteborg: Gullbergsgärde (Ohlsen in 1925 and 1926, St; no fr.). Skåne: Malmö (Blom, St; Holmberg, Br). Kristianstad (Blom, St; Lange, St; no fr.). Ystad, ad portum (Sandberg, Br). Landskröna (Nilsson, St). Södermanland: Nacka, Hästholmen near "Tre Kronor" Mill (Vestergren, St). Nacka, "Svetsjo" Mill (Laurent). Småland: Kalmar (Anderson, St, De, O). Kalmar, harbor (Trolander, St). Ruda, railway station (O. Köhler, St, Br, De). Stockholm: Hästholmen (Haegerstolpe, St). Saltsjöqvarn (Segerström, St). Hammerbysjö (Uggla, St). Hortus Bergianus, not cult. (Scogger, St). Bohuslän: Marstrand, harbor (Blom, St; no fr.). Västmanland, Västerås, vicinity of the harbor (Ohlin, St).

Norway: V. Aker, Storo (Holmboe, St; no fr.).


Netherlands: Schiedam (W. D. C. Kooper, Ut). Ooi (W. D. C. Kooper, Z, Ut). Zeist (van Stenis, Ut). Rotterdam (Jansen & Wachter 24567, 24584, 24585, 24587, hb. Leiden; determined as R. salicifolius subsp. triangulivalvis by Danser).

Switzerland: Fosses de la campagne Prevost, bord de l'Arve, Genève (L. Naville, De).
This is the plant to which the name *R. mexicanus* Meisn. was applied in a more ample sense by Fernald, *Rhodora* 10: 19. 1908. *R. triangulivalvis* differs from *R. mexicanus* by the smaller size of valves and nutlets. The measurements given in the above description are the average obtained from a large number of specimens examined. Since such small-fruiting individuals never occur in Mexico as in the far North, I believe that the two types deserve recognition. At most they may be united as subspecies under *R. mexicanus*; see the general discussion of the *Salicifolii*, p. 12, and the discussions of *R. mexicanus* and *R. utahensis*. *R. triangulivalvis* is the only species of subsect. *Salicifolii* that occurs rather frequently introduced in Europe.

In the mountainous western parts of the United States is a form differing in some respects from the type:

Var. *oreolapathum* Rech. f.—Differt a typo caule minus elato, 20–40 cm. tantum alto, saepe crassiore, interdum profundius sulcato, ramis inflorescentiae brevioribus, inflorescentia in statu fructifero compacta, foliis minoribus saepe proportione latioribus, valvis et nucibus minoribus.—The specimens belonging to this variety are indicated in the list of specimens examined by an added “or.”

Not all the characters mentioned above are always to be observed together, but the tendency to develop forms showing several characters is generally obvious in the Rocky Mountains from New Mexico to Idaho.

In connection with *R. triangulivalvis* it is necessary to discuss certain critical forms which probably are nearly related to it. On account of the lack of illustrative material, I can not give any judgment on their systematic position.

(1) *R. hesperius* Greene, *Pittonia* 4: 234. 1899–1901; Piper 225. 1906; Rydb. R. 231. 1922.—Type locality: Bottom lands near Bingen, Washington (*Suksdorf* 2259, Ca, P; photo. of type from Greene Herbarium, MW). Stems and axillary branches slender, curved; leaves (dried) relatively thin, lanceolate, about 5 times as long as broad, narrowed to each end, the lateral nerves forming an angle of 45° with the midrib; branches of the panicle slender, strongly curved, spreading; valves triangular, the sides of nearly equal length, to 4 mm. long and wide, entire, only one with a relatively small and
narrow grain (not without grains as the author states, in error!). Among the *Rumex* material lent from Pullman, Washington, were no further specimens that agreed with Greene's type. In the New York herbarium, I saw a specimen without fruits, collected by Suksdorf at the original locality, named *R. hesperius*, with much narrower, nearly linear-lanceolate leaves; only further observation of living plants will decide whether it is a mere modification or a distinct species or a variety of *R. triangulivalvis*.

(2) Unfortunately I failed to see the type of *R. mexicanus* Meisn. var. strictus Peck, Proc. Biol. Soc. Wash. 47: 185. 1934, described by the author as follows: "Erectus gracillimus strictusque ramis arcte ascendentibus; foliis lineari-lanceolatis vel angustae oblongo-lanceolatis ad petiolos gradatim contractis; inflorescentia angusta ramis arcte ascendentibus; segmentis interioribus perianthii anguste ovatis minime deltoideis. Type, Peck 13924, in a wet meadow 8 mi. south of Burns, Harney Co., June 24, 1925. A very narrow-leaved, slender, and strict form, quite unlike the typical plant.” Type in herbarium of Willamette University, Oregon. At present I can not decide whether it is a distinct unit or perhaps a variety of *R. triangulivalvis* or of another related species. I have seen specimens that seem to agree more or less with the description of var. strictus: California: Sierra Nevada, Salmon Creek, Tulare Co., meadow (Hall & Babcock 5166,Ca).—Arizona: Fort Whipple (Coues & Palmer, SL).—Wyoming: Danee(?) (Pammel 14, SL).—Nevada: White Mts., Trail Canyon, 3,000 meters, in and around springs and slowly flowing streams (Duran 3351, P).

(3) In the state of Washington—for instance, Wilson Creek, Douglas Co. (Sandberg & Leiberg 329, Ko, Up, Ca; Lake & Hull 651, SL)—occurs a form which is remarkably distinguished from *R. triangulivalvis* by its narrow and consequently more pointed valves, scarcely 3 mm. long and 2 mm. broad. All valves show narrow grains, nearly equal in size. The pedicels are often somewhat longer (to 1.5 times the fruit length) than those of the typical *R. triangulivalvis*. The branches of the fruiting panicle are divergent-ascending, that is, bowed, the lower whorls often somewhat remote.

*Explanation of Figure 10.*—*Rumex triangulivalvis* (Dans.) Rech. f., half natural size, Butte, North Dakota, Lunell.

17. *Rumex lacustris* Greene. Figure 11
Perennis. Caulis 50-90 cm. altus, tenuiter sulcato-striatus purpureo-violaceo suffusus aut (f. *aquatilis* Rech. f.) ad $\frac{1}{2}-\frac{3}{2}$ longitudinis
simplex stricte erectus fistulosus submersus, internodiis inferioribus valde elongatis, nodis inferioribus aphyllis radiculas adventivas tantum gerentibus, parte superiore brunnescens flexuosus sparse foliosus ramosus rami tenues flexuosi foliosi divergentes inflorescentiis parvis ± contractis terminati—aut (f. terrestris Rech. f.) caules complures tenues decumbentes vel ascendentes, 20–40 cm. alti, a basi crebre ramosi ± papillosi. Ochreae albidibrunnescentes evanescentes. Folia consistens in vivo verosimiliter subcarnosa, in sicco subcoriacea, colore in sicco olivaceo, ambitu oblongo–vel ovato-lanceolata, basi cuneata, apice aequaliter angustata, parte superiore brunnescens flexuosus sparse foliosi, ramis subtus ramis ramis tenues flexuosi, ramis ramis ramis divergentes inflorescentiis parvis contractis terminati aut (f. terrestris Rech. f.) caules complures tenues decumbentes vel ascendentes, 20–40 cm. alti, a basi crebre ramosi ± papillosi. Ochreae albidibrunnescentes evanescentes. Folia consistens in vivo verosimiliter subcarnosa, in sicco subcoriacea, colore in sicco olivaceo, ambitu oblongo–vel ovato-lanceolata, basi cuneata, apice aequaliter angustata, parte superiore brunnescens flexuosus sparse foliosi, ramis subtus ramis ramis divergentes inflorescentiis parvis contractis terminati aut (f. terrestris Rech. f.)


**DISTRIBUTION:** Oregon, California.

**OREGON:** Shirk, 1,500 meters (*Leiberg 2589*, Wa, Ca, Be; terr.). Swan Lake Valley, Klamath Co. (*Applegate 472*, Wa, G; aqu.; no fr.). Stein’s Mountain (*Howell 535*, UW; 909, Ch; terr.; no fr.). In dry ponds, Barren Valley (*Cusick 1960*, P, Ca, SL; terr.). Moist ground, north end of Summer Lake, Lake Co. (*Peck 15698*, SL; terr.). Shore of Goose Lake (*Austin & Bruce 2294*, Ca; terr.).
Fig. 11. *Rumex lacustris* Greene.
California: Silver Lake, Lassen Co. (Baker & Nutting, MW; photo. of type, Hb. Greene).

This species is well characterized by its extremely small fruiting perigonia. It occurs in two ecologic types, terrestrial and aquatic, quite analogous to Polygonum amphibium L. This fact has been unknown till now, and this high degree of capability of accommodation to changing level or complete lack of water is unique in the genus Rumex. Greene has described a form of the aquatic state with tall, fistulous stems, straight upright and submerged for half or two-thirds their height. The lower and middle leaves are not developed in this case; instead of the leaves, tender adventive rootlets arise from the lower nodes. The upper leaves are emersed and somewhat pubescent, at least on the under side. But there exists also an entirely submerged form, as represented by Applegate 472, with large, entirely glabrous leaves. The terrestrial state is either broad- or narrow-leaved, and the leaves are pubescent usually on both sides. This is the single case of pubescence in Subsect. Salicifolii. The area of this interesting species is strictly limited to Oregon and California.

Explanation of Figure 11.—Rumex lacustris Greene, half natural size: (a) f. terrestris Rech. f., Oregon, Cusick 1960; (b) f. aquatilis Rech. f., Oregon, Applegate 472. Valves 4 times natural size, from Cusick 1960.

18. Rumex transitorius Rech. f. Figure 12

Fig. 12. *Rumex transitorius* Rech. f.
pedicelli filiformes validiusculi perigonio maturo aequilongi vel eo 1.5 (–2) -plo longiores, in quarta circiter parte inferiore distincte incrassato-articulati, in basin perigonii abrupte incrassato-dilatati. Perigonii foliola exteriora ± 1.6 mm. longa anguste lanceolata acuta. Perigonii foliola interiora (valvae) in statu maturo 2.5–3 mm. longa, 2–2.3 mm. lata, ambitu ovata vel ovato-lanceolata, consistencia rigide membranacea, colore sordide aurantiaco vel atro-bruneo, basi rotundata, apice acuta, margine integerrima vel sub-integra, facie irregulariter interdum obsolete reticulato-nervosa reticulo in utroque latere mediante ad summum 2 maculas lato. Valva unica (var. *monotylos* Rech. f.) vel saepius omnes callum ovatum crassum prominentem basi rotundatum apice acutum ad 2 mm. longum ad 1.5 mm. crassum magnam partem valvae abscondentem perientes; calli plerumque sublaevae. Nux atrofusca ca. 2 mm. longa, ca. 1.3 mm. lata, vix infra medium latissima, basi brevius, apice longius acuminata.


**DISTRIBUTION:** Pacific United States and Vancouver Island.

**BRITISH COLUMBIA:** Vancouver Island, Sidney (Macoun 87914, O). Nanaimo (Macoun 1563, 83928, O). Salt marshes, Departure Bay (Macoun 23756, O).

**WASHINGTON:** Seattle, common along coast, common in moist places (Freiberg, SL; E. M. Bardell, SL). Walla Walla (Savage, Cameron & Lenocker, SL; approx. var. *monotylos*). Friday Harbor (Peck 13005, P). San Juan Island (Reynolds, Ch).

**OREGON:** Garibaldi (Hitchcock, 12361, Wa; no fr.). Linn Co., near Tangent (E. E. Stanford 1645, SL; var. *monotylos*?; no ripe fr.). Sand north of Forestry Building, Portland (Thompson 3717, Ke; var. *monotylos*). Corvallis, streets (Cole & Fleischmann, SL, Wa; var. *monotylos*).

**CALIFORNIA:** Samoa, Humboldt Co. (H. H. Smith 3866, Wa). Humboldt Co., vicinity of Eureka, waste places, not abundant, 0–150 meters (Tracy 1157, Ca). Butte Co., in low field along Butte Creek between Durham and Nelson, in open, treeless valley, growing with *Lasthenia*, *Deschampsia*, *Navarretia*, *Psilocarpus*, and *Boisduvallia*, 52 meters, widely distributed over the western half of the county (Heller 11396, Ca). Vicinity of Berkeley (Walker 172, La, Ca; Greene, Ca, var. *monotylos*; Davy, La). Santa Clara Co., Santa Cruz Peninsula, north embankment of Lake Lagunita, Stanford University (Dudley, SL, Br).
Under the name *R. transitorius* I include all the Pacific *salicifolius*-like forms with perigonium segments covered for the larger part, but never entirely, by the large grains. The leaves are often rather short and the branches of the panicle are curved-spreadng. The rather rare var. *monotylos* sometimes is similar to the genuine *R. salicifolius* Weinn., but has larger fruits. Some of the 3-grained forms are similar to *R. pallidus* Bigel., but they are distinguished from that species by shorter, more globular, and rather smooth grains.

*Explanation of Figure 12.*—*Rumex transitorius* Rech. f., half natural size; California, Tracy 1157. Valves 4 times natural size, California, *Dadley* in 1897.

19. *Rumex pallidus* Bigel.  Figure 13

Perennis. Caules complures tenues graciles procumbentes vel arcuato-ascendentes flexuosi, pallide virescentes vel brunescentes vel purpureo-suffusi, tenuiter sulcato-suturati, glabri laeves, 30–70 cm. alti, a basi in axillis foliorum ramulos foliosos gerentes. Ochreae pallide bruneae hyalinae valde caducae. Folia omnia consistentia in sicco rigide papyracea, colore pallide viridi, utrinque glabra et levia. Folia caulina inferiora anguste lineari-lanceolata plana vel leviter undata, latitudine 7–10-plo longiora, 10–20 cm. longa, 1.3–2.5 cm. lata, basi ut apice sensim subaequaliter acuminata. Nervi secundariorii vix conspicui, a primario angulo ca. 45° abeuntes. Petioli foliorum latitudine folii plerumque breviores. Folia caulina superiOra foliaque ramorum axillariorum angustiora et brevius petiolata. Rami inflorescentiae ± tenues singuli simplices vel inferiores iterum ramosi, inferiores interdum angulo recto fere divergentes, paniculam parvam vel maiusculam apertam formantes. Rami inflorescentiae infimi tantum folio suffulti. Florum glomeruli fere omnes contigui foliis non suffulti. Perigoniorum fructiferorum pedicelli in tertia vel quarta parte inferiore tenuiter sed distincte incrassato-articulati, in basin perigonii subito dilatati, perigonio fructifer breviore vel subaequilongi. Perigonii foliola externa 1.6–1.8 mm. longa. Perigonii folia interiora (valvae) in statu maturOra 3–4 mm. longa, ± 2 mm. lata, ambitu ovato-lingulata, consistentiOa membranacea, colore virescenti vel flavescenti-bruneo, basi rotundata, apice obtusiuscula vel acutiuscula, margine integra, facie inconspicue reticulato-nervosa, omnia aequaliter callifera. Callus erassus prominens, colore bruneo vel flavescenti-aurantiaco, ca. 2 mm. longus, ca. 1–1.2 mm. latus, basi rotundatus apice acutus.

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Nux ca. 2.5 mm. longa, 1.1–1.2 mm. lata, atrofusca, infra medium latissima, basi breviter, apice longius acuminata.


DISTRIBUTION: Eastern Canada, northeastern United States, Alaska.

NEWFOUNDLAND: Shores of Random Sound, Trinity Bay, red granite gravel beach, Clarenville (*Fernald & Wiegand, O*). In sand, seashore (*Jansson 466*, St).


PRINCE EDWARD ISLAND: Sandy strands and dryish borders of salt marshes, Plat River, Prince Co. (*Fernald & St. John 11037*, Wa, Ca, Ke).


NEW HAMPSHIRE: Portsmouth (*Davis*, St).


Rumex pallidus is characterized and distinguished from *R-triangulivalvis* by ovate valves, all bearing large, equal grains so that only a narrow margin of the valve is conspicuous, and by the larger nutlets.

The name *R. pallidus* is used here in a more ample sense than Fernald (loc. cit.) used it, so that individuals showing the typical fruit characters but not having the characteristic diffuse panicle with rectangular, spreading lower branches or the slender stem and narrow leaves are included.

The area of *R. pallidus* in eastern Canada and in the northeastern United States seems to be rather limited. From middle and southwestern Canada I have seen no specimen belonging to this species, but from northwestern Canada (Yukon) and Alaska I have seen specimens differing not at all from some of the eastern, which have a strict habit, larger leaves, and more erect fruiting branches. *R. pallidus* seems to avoid the inland and to prefer maritime regions.

Explanation of Figure 13.—Rumex pallidus Bigel., half natural size; Nova Scotia, Fernald 21053. Valves 4 times natural size: (a) Nova Scotia, Howe 1590; (b) Vancouver Island, Macoun 83927.

20. Rumex sibiricus Hultén. Figure 14

Perennis. Caulis tenuis gracilis ascendenti-erectus strictus vel subflexuosus, (20-) 35 (-70) cm. altus, pallide bruneus saepe purpureo-suffusus, tenuissime sulcato- striatus, glaber laevis, plerumque a basi ex axillis foliorum ramulos foliosos emittens. Ochreae albidae brunnescentes hyalinae caducae. Folia omnia consistens in sicco papyracea, colore pallide viridi, levissime papillosa vel glabra et levia. Folia caulina anguste lineari-lanceolata, plana vel leviter undata, latitudine 6-8-plo longiora, ad 8 cm. longa, ca. 1 cm. lata, basi et apice subaequaliter sensim acuminata. Nervi secundarii vix conspicui a primario angulo ca. 45° abeuntes; petioli foliorum 1.5-3 cm. longi. Folia caulina superiors angustiora brevius petiolata. Rami inflorescentiae tenues singuli simplices, primum suberecti, deinde inferiores quidem patentes, paniculam laxiusculam apertam formantes. Rami infimi tantum folio suffulti, flororum glomeruli inferiores remoti, superiores contigui, omnes folii non suffulti. Perigoniorum fructiferorum pedicelli prope basin tenuiter incassato- articulati, in basin perigonii subito subinflato-dilatati, perigonio fructifero subbrevores vel aequilongi vel sublongiores: 1.5-3.5 mm. longi. Perigonii foliola exteriora ca. 1.5 mm. longa lanceolata acuta. Perigonii folia interiora (valvae) in statu maturo 2.5-3 mm. longa, 1.5-2 mm. lata, ambitu ovato-lingulata, consistens membranacea, colore
brunea; basi rotundato-angustata, apice obtusiuscula vel acūtiuscula, margine integra, facie inconspicue nervosa, omnia aequaliter callifera. Callus crassus prominens, colore bruno-aurantiaco, 1.7–2 mm. longus ± 0.8 mm. latus, acute in nervum medium valvae abiens. Nux 2–2.5 mm. longa, 1–1.2 mm. lata, infra medium latissima, basi brevius apice longius acuminata atrofuscus (punctis tenuissimis opaca).


**Illustration:** Hultén, loc. cit.

**Distribution:** Northern and eastern Siberia and Kamchatka.

**Siberia:** Jenisei: Sopotschnoj Island (*Landström*, St; leaves only, mixed with *R. maritimus*); Wikandrovsky Island (*M. Brenner*, St; type of *R. sibiricus*); Plachino 68° 5' (*M. Brenner*, St, UW; no fr.).—Oblastia Jakutsk: Kumash-Sur, 71° 30' (*H. N. Nilsson*, St; no fr.); Balaganach, 71° 35' (*H. N. Nilsson*, St; no fr.); Bulun, 70° 43' (*H. N. Nilsson*, St). Kolyma River (*Augustinowicz*, Ko, UW, MW; no fr.).

**Kamchatka:** Shtchapina (*Komarov* 4872, MW; no fr.).—For further indications, see Hultén, loc. cit.

*Rumex sibiricus* is the only extra-American species of the *Salicifolii*. I include it here to make the treatment of this group complete.

*R. sibiricus* is closely related to *R. pallidus* Bigel., but its stem is more slender, the branches of the fruiting panicle are very wide-spread, the leaves usually (but not always) very thin and narrow. The principal characters lie in the much smaller fruiting perigonia with narrower, more pointed grains and smaller, narrower nutlets. Most of the specimens examined are flowering, but usually easily recognized by habit and vegetative characters.

**Explanation of Figure 14.—Rumex sibiricus** Hultén, half natural size; collected by Brenner. Valves 4 times natural size, Brenner.

21. *Rumex utahensis* Rech. f. Figure 15

Perennis. Caules complures stricte erecti rarius subflexuosi vel arcuato-ascendentes, graciles vel validi, humiles 15–40 (–60) cm. alti, tenuiter sulcato-striati, glabri, laeves, bruno-virescentes vel purpureo-suffusi, plerunque a basi in axillis foliorum surculos foliosos preferentes. Ochreae albidae vel pallide bruneae hyalinae caducae. Folia omnia in sicco consistencia tenuiter papyracea, plana vel leviter undata, colore pallide flavescenti-viridi, utrinque glabra et laevia.
FIG. 15. Rumex utahensis Rech. f.


DISTRIBUTION: Rocky Mountains between 36° and 43° N. Lat.

ALBERTA: Calgary (Macoun, O; leaves narrow).


IDAHO: Lewiston, Nez Perce Co. (Heller 3236, Ca).

UTAH: Wasatch Mts., Peterson Canyon, 2,400–3,000 meters (Pammel & Blackwood 3957, SL). Head of Middle Fork of Manti Canyon (Coville & Tidestrom, Wa). Ephraim Canyon, 2 miles below summit, 2,700 meters (Tidestrom 307, Wa). Wasatch Plateau, east of Ephraim (Tidestrom 214, 2468, Wa). Common in ponds, aspen zone, Ephraim Canyon, 2,400 meters (Tidestrom 1249, Wa; no fr.).
Abundant on rocky slope, Eccles Canyon, east of Mt. Pleasant, 2,880 meters (Tidestrom 1880, Wa). Prince Canyon at Kyune, 1,950 meters (Jones 5603j, Wa). Divide between Sevier and Beaver rivers, near Belknap Peak (Rydberg & Carlton 7336, Wa; no fr.). Huntington Canyon, Emery Co. (Garrett 7019, Ch).

NEVADA: Slide Mountain, in granite, 2,340 meters, Washoe Co. (Heller 10952, NY, Ke; no fr.). Washoe Co., Mt. Rose, 2,895 meters (Heller 10654, Wa). Drying mud bottom, 1,740 meters, Mountain City (Nelson & Macbride 2181, Be, St).

OREGON: Hood River Co., Columbia River bottoms (Henderson 493c, f, SL).


The valves of R. utahensis are small and without tubercles, and in this respect similar to those of R. californicus Rech. f., having more pronounced teeth on the margin, but the habit of these two species is usually very different. R. utahensis has short and stout, little branched stems, relatively broad leaves, and a small and very contracted fruiting panicle. R. californicus, on the contrary, has elongate, slender, much branched stems, narrow leaves, and an elongate, somewhat lax panicle. The plant described by Jepson, 292, 1923, as R. salicifolius var. montigenitus shows intermediate characters between R. californicus and R. utahensis.

Flowering specimens of R. utahensis are not to be distinguished from R. triangulivalvis var. oreolapathum Rech. f., because the habit of this Rocky Mountain variety of the widespread R. triangulivalvis is exactly the same. I believe that R. utahensis is nearly related to R. triangulivalvis var. oreolapathum, and that the first may be considered a grainless parallel type of the latter. As this grainless type is strictly limited to the Rocky Mountains and occurs there in the same areas as R. triangulivalvis var. oreolapathum, without intermediates, it gives the impression of a certain independence and may be maintained for the present as a distinct species.

Explanation of Figure 15.—Rumex utahensis Rech. f., half natural size; Utah, Jones 5603j. Valves 4 times natural size, from Tidestrom 307.

22. Rumex crassus Rech. f. Figure 16

Perennis. Caules complures validi procumbentes vel flexuoso-ascendentes, 20–50 cm. longi, basi levius apicem versus profundius
sulcato-striati, glabri laeves, bruneo-virescentes vel purpureo-suffusi, a basi ex axillis foliorum ramos foliosos serius elongatos floriferos preferentes. Ochreae pallaeae bruneae hyalinae caducae. Folia omnia in sicco consistencia crasse et rigide coriacea, colore olivaceo vel obscure viridi vel brunescente subtus pallidiore, utrinque glabra et levia. Nervi secundarii foliorum angulo 45°–60° a primario abentes. Petiolini laminae latitudinem aerantes vel superantes. Folia caulina superiores foliaque ramorum axillariorum angustiora brevius petiolata. Kami inflorescentiae breves validi singuli simplices, infimi tantum folio suffulti, florum glomerulis omnibus approximatis in statu fructifero contiguis, paniculam ± parvam compactam confertam formantes. Perigoniorum fructiferorum pedicelli validi, in tertia vel quarta parte inferiori increassato-articulati, ad basin perigonii nodoso-increassati, perigonio maturo (1–) 1.5–2.5-plo longiores. Perigonii foliola exteriora ca. 2 mm. longa. Perigonii folia interiora (valvae) in statu maturo 4–5 mm. longa, 3–4 mm. lata, ambitu ovato-vel deltoideo-lingulata, consistencia in sicco membranaceo-coriacea, colore atrobruneo-purpureo, basi rotundata, apice acuta, margine minute irregulariterque crenulato-denticulata. Valva anterior callum maximum ovatum ± 4 mm. longum, ± 2.5 mm. crassum, totam fere faciem valvae abscondentem ferens, valvae ceterae valide reticulato-nervosae, nervo mediano ceteris crassiore ± plerumque autem non callifero, rarissime callum minutum proferens. Nux matura 2–2.5 mm. longa 1.7–2.1 mm. lata vix infra medium latissima basi rotundata, apice breviter acuminata.


DISTRIBUTION: California, Oregon.

OREGON: Beach, Newport, Lincoln Co. (Spillman, P, Ch). Beach, Seal Rock, Lincoln Co. (Peck 10575, Ch).

Fig. 16. *Rumex crassus* Rech. f.

This species has been taken by Fernald in Rhodora (loc. cit.) for the genuine R. salicifolius, which it resembles in that only one of the inner fruiting perigonium segments bears a very large and swollen grain covering nearly the whole surface of the segment; but the leaf measurements given by Weinmann do not agree with this plant. The fruiting perigonia and the nutlets of R. crassus are more than twice as large and the leaves are shorter and broader, the stem often procumbent or ascending. The habit of R. crassus is peculiar and hardly to be compared with that of other species of the Salicifolii.

Explanation of Figure 16.—Rumex crassus Rech. f., half natural size; San Mateo, California, Skottsberg. Valves 4 times natural size; San Francisco, Andersson.

23. Rumex salicifolius Weinm. Figure 17

Perennis. Caulis ascendens vel erectus, flexuosus, tenuis sed firmus, 30–90 cm. altus, tenuiter sulcato-striatus, bruneus saepe purpureo-suffusus, plerumque a basi ramos foliosos serius florentes et elongatos arcuato-divergentes emittens. Ochreae bruneae membranaceae caducae. Folia omnia plana, glabra et laevia, consistentia in sicco rigide coriacea, colore pallide olivaceo, angustissime membranaceo-marginita, nervi laterales angulo ± 45° a mediano abuentes. Petiolus folii laminae latitudinem aequans vel paulo superans. Folia caulina inferiorea angustissime lanceolata, basi apiceque aequaliter sensim angustata, latitudine ± 7-plo longiora, ad 13 cm. longa. Folia caulina superiorea et folia ramealia sensim minora et angustiora. Rami inflorescentiae tenues tenaces singuli simplices, ab axi principali angulo ca. 45° arcuato-patentes, infimis tantum folio suffulti, paniculam saepe elongatum ± apertam formantes. Florum glomeruli infimi remoti, superiores contigui compacti, omnes foliis suffulcrantibus carentes. Perigoniorum fructiferorum pedicelli perigoniiis maturis (1–) 1.5 (–2) -plo longiores, tenues sed firmi, prope basin tenuiter incrassato-articulati, ad basin perigonii subito ali-
FIG. 17. *Rumex salicifolius* Weinm.
quantum incrassati. Perigonii foliola exteriora anguste lanceolata acuta basibus interiorum appressa, 1.2–1.5 mm. longa. Perigonii folia interiora (valvae) in statu maturō 2.3–3 mm. longa, 1.7–2.1 mm. lata, consistentia coriaceo-membranacea, colore bruneo-rufescenti, ambitu deltoideo, apice acuta, margine subintegra vel minutissime irregulariter denticulata. Valva anterior callum magnum ovatum totam fere faciem valvae abscondentem proferens, valvae alterae plerumque ecallosae, facie tenuiter prominenter reticulato-nervosasae, nervo mediano ceteris validiore. Nux maturaatrobrunnea, 1.8–2 mm. longa, 1.1–1.3 mm. lata, basi brevius, apice longius acuminata, paulum infra medium latissima.


DISTRIBUTION: Middle and southern California; northern Mexico.


MEXICO: Sonora (Thurber 324, G, Ch). San Pedro Mártir (Brandegee, Ca; no fr.).


I have studied Weinmann’s type specimen in the Upsala Herbarium and cultivated specimens in the Copenhagen Herbarium grown from seeds sent by Weinmann. The measurements of leaves given by Weinmann in his short description correspond exactly with this plant but not at all with the broad- and short-leaved, large-fruited plants taken by Fernald in Rhodora for the genuine R. salicifolius.

Our figure shows Weinmann’s type specimen, representing an early state of development, in which the axillary branches are not yet elongate and flowering. Later the ramification of R. salicifolius is very abundant and then the habit is quite different, closely simulating that shown by our figure of R. californicus.

R. salicifolius is characterized by the small fruiting perigonia with only one segment bearing a grain; but this grain is very large and covers the whole surface of the perigonium segment.

As to the differences from the next related species, R. crassus Rech. f. and R. californicus Rech. f., see under those species. These three species are almost limited to California.

Explanation of Figure 17.—Rumex salicifolius Weinm., half natural size, type. Valves 4 times natural size, from Dudley 4351.

24. Rumex californicus Rech. f. Figure 18

Perennis. Caulis ascendens vel suberectus, 30–60 cm. altus, ± angulato-flexuosus vel strictus, plerumque gracilis sed firmus, virescens vel brunnescens, tenuiter sulcato-striatus, saepe iam a basi vel infra medium in axillis foliorum ramos foliosos arcuato-divergentes tenues flexuosos emittens. Ochreae albidae valde caducae.
Folia caulina et ramealia lineari-lanceolata ± plana, in sicco rigide subcoriacea, obscure viridia, nervi laterales vix conspicui a mediano angulo ± 45° abuentes, ut tota planta glabra et levia, angustissime membranaceo-marginata, basin et apicem versus aequaliter sensim angustata. Folia inferiora ad 10 cm. longa, ad 1.5 cm. lata, petiolo latitudinem folii ± aequante; folia superiora sensim minora angustiora breviora petiolata. Rami inflorescentiae tenues singuli simplices, ab axi principali angulo 30°-50° arceutado-divergentes vel axi fere appressi, inferiores folio suffulti paniculam laxiusculam apertam vel densiusculam elongatam formantes. Florum glomeruli multiflori, infimi ± remoti, superiores approximati vel omnes approximati, in statu fructifer contigui omnes folii suffuscrantibus carentes. Perigoniorum fructiferorum pedicelli in tertia vel quartà parte inferiore tenuiter incrassato-articulati, ad basin perigonii subito subinflato-dilatati, perigonii maturis aequilongi vel 1.5 (2) -plo longiores. Perigonii foliola exteriora ovato-lanceolata acutiuscula, 1.8 mm. longa, dimidiam latitudinem interiorum aequantia vel paulo superantia. Perigonii folia interiora (valvae) in statu maturō ± 3 mm. longa, ± 2.5 mm. lata, ambitu late triangularia, consistenta crasse membranacea, colore fusco (bruno-rufescente) basi truncata vel late cuneata apice acuta vix producta margine basin versus minute irregulariter denticulata, facie tenuiter sed prominenter reticulato-nervosa, nervo mediano ceteris validiore interdum longitudinaliter incrassato. Nux matura atrofusca vel fere nigra, ca. 2 mm. longa, ca. 1.3 mm. lata, basi et apice subaequaliter acuminata, paulum infra medium latissima.


DISTRIBUTION: California and Arizona.

OREGON: “Auf fremder Erde (ballast) oder nahe dabei,” Albina, Portland (Suksdorf, P).

ARIZONA: Tucson (Tourney 343c, Wa).


*Rumex californicus* is characterized by small, broadly triangular valves without or with only a suggestion of a grain. The valves are finely denticulate at the margin toward the base. In habit and in shape of the leaves it is similar to the genuine *R. salicifolius* Weinm. Like that species it has often relatively long pedicels. In flower these two species can not be distinguished. Both are limited to California and Arizona.

I consider that *R. salicifolius* var. *denticulatus* Torr. must be this plant, but the name *denticulatus* can not be transferred to specific rank because there exist older homonyms by Campdiera and C. Koch. *R. salicifolius* var. *montigenitus* Jepson (292. 1923) seems to form a link between *R. californicus* and *R. utahensis* (see remarks under the latter).

Explanation of Figure 18.—*Rumex californicus* Rech. f., half natural size; California, Demaree 10514. Valves 4 times natural size, from Grant 4432.


Widely creeping, with somewhat fleshy, obovate leaves and small fruiting panicles; leaves somewhat crisped marginally, the rather short petioles and leaf nerves somewhat scabrous beneath; branches of the panicle few, short; whorls usually approximate, without leaves; pedicels thickish, shorter than the fruit, usually jointed at the middle; valves firm, triangular-ovate, entire, 4–5 mm. long, all with a prominent grain; ripe nutlets dark brown, broadest in the middle, about 2.5 mm. long.

This species of peculiar habit is widespread in southern South America and introduced to some parts of North America and Europe. The height of stems, thickness of leaves, and size of valves are variable.


**ALABAMA:** Ballast, Mobile (*Mohr* 1, SL).
Oregon: Ballast at Albina, Portland (Suksdorf 1798, G, P; 730, 1211, P).

26. Rumex hymenosepalus Torr. Figure 9, b


ILLUSTRATIONS: Trelease 1892, pl. 18; Bot. Mag. 121: pl. 7433 (= var. *salinus*).

DISTRIBUTION: Southwestern United States and Mexico.

WYOMING: Bitter Creek (A. Nelson 4780, Wa; intermediate between *eu-hymenosepalus* and *salinus*). Bitter Creek, Sweetwater Co. (A. Nelson 3114, Co; type of *tuberosus* A. Nelson). Seven Mile Lake (E. Nelson 4332, La; var. *salinus*). Red Desert, Orenda Butte (A. Nelson 7141, La; var. *salinus*).

COLORADO: Sandy canyon, entrance Mesa Verde National Park (Nelson 421, Ca). Hillsides, Surface Creek, Mesa Grande, 1,860 meters (Purpus 9, Mu; *eu-hymenos.; Purpus 9, Be; sal. (?); no ripe fr.). Palisades (Crandall 3833, P, NY, Wa; *eu-hym.*). Dry, adobe flat, 1,620 meters, Paradox, Montrose Co. (Walker 202; leaves only). Dry hillside, 1,620 meters, Naturita (Payson 233, St, no ripe fr.; P). Junction of Navajo and Spruce Canyon 1,900 meters (Schmoll & Nusbaum 1654, La; var. *salinus*; no ripe fr.)

NEW MEXICO: Aztec (Baker 296, Ca, P, Wa, Ke, Be, Z; sal. (?)). Gray, Lincoln Co., 1,800 meters (Skehan 22, MW; *eu-hym.*). Organ Mts., Dona Ana Co. (Wooton, Ca. no fr.). Agricultural College, Mesilla Valley, Dona Ana Co. (Wooton, Ch, P, Wa; no ripe fr.). Mangas Springs, 18 miles northwest of Silver City, Grant Co., 1,430 meters (Metcalfe 56, Ca, Wa; no ripe fr.). Sierra Co., 1 mile west of Hillsboro, 1,650 meters, sandbar (Metcalfe 1545, Wa, Be; no ripe fr.). Near Agricultural College (Standley, Wa; *eu-hym.*). Without locality (Wright 1782, Bo). Sandia Mts. 2,878 meters (Castetter 1782, La; prob. *eu-hym.*).

TEXAS: Toyah Creek (Tracy & Earle 90, Be; sal., Wa, MW; no ripe fr.). Estelline, sandy soil (Reverchon 4248, Wa; no ripe fr.). Frijoles–El Paso (Nelson 11443, La; appr. var. *salinus*). Sweetwater, Nolan Co. (Reverchon 1349, Ch).

UTAH: St. George, 600 meters (Jones 1643, Be, UW, Bu). Santa Clara, 900 meters (Jones 5112, Ca, La; *eu-hym.*).

ARIZONA: Tucson (Touney, Wa, no ripe fr.; Ca, NY; all sal.). Fort Verde (Mearns 300, NY, Co; type of *R. arizonicus* Britt.; no ripe fr.). Verde (W. W. Jones, Ca; sal.). Sandy river bank, Tempe
(Ganong & Blaschka, Be; sal.). Phoenix (Kunze, NY; no ripe fr.). In plowed fields at Calabasas (Tidestrom 885, Wa; no ripe fr.).

NEVADA: Scattered in sandy draws, Moapa, 500 meters (Tidestrom 8613, Wa, St; no ripe fr.).

CALIFORNIA: Newhall, dry, sandy soil, (Pringle, Wa, Ke; sal.). Guadalupe Ranch, Tehachapi, Kern Co. (B. Davy 2174, Ca; leaves only). Sand flats, South Fork Valley, 2 miles east of Weldon, Kern Co. (Voegelin 89, Ca; eu-hym. (?)). Vicinity of San Diego, in sandy fields, 60 meters (Spencer 141, Ca, Mu; eu-hym.). Oneonta, San Diego Co. (Chandler 5073, NY; eu-hym.). Whitewater (Vasey, Wa, Ke; no ripe fr.). Vicinity of San Bernardino, 300–750 meters (Parish 4634, Wa; intermediate between eu-hym. and sal.). San Bernardino Valley washes (Parish 11712, Ca; no ripe fr.). Sandy mesas, San Bernardino (Parish 678, MW; eu-hym., Ca, Wa, Be, Mu; no ripe fr.). Rock Springs, 2,340 meters, San Bernardino Co. (Ferris 7319, NY). Antelope Valley, Llano Verde (B. Davy 2567, Ca; eu-hym.). Antelope Valley (B. Davy 2591, Ca; leaves only). Claremont (C. E. Howery, SL; no ripe fr.). Colton (M. E. Jones, Be; intermediate between eu-hym. and sal., Bu; no ripe fr.). Ramona (Brandegee, Ca; no ripe fr.). Palm Spring, 120 meters, in sandy wash (Jaeger 908, Wa; intermediate between eu-hym. and sal.). Hoxin’s Ranch, near Nipoma (Brewer 405, Wa; eu-hym.). Los Angeles (Hasse, Ch). Azusa, Los Angeles Co. (H. H. Smith 4929, Ch; var. salinus). Covina (Grant 1141, Ch). San Dieguito Valley (Angier, Ch; var. salinus). Pacific Beach (Snyder, Ch). Pasadena, sandy soil (McClatchie, NY; no ripe fr.). California (Vasey in 1881, Le).

MEXICO: Chihuahua, near San Diego (Hartmann 618, Wa, Ca; no ripe fr.). Vicinity of Chihuahua, 1,300 meters (Palmer 27, NY, Ch, Be, Wa, G; salinus). Northern Lower California (Orcutt, Ca; eu-hym.; Ch, sal.). San Quintén Bay (Palmer 689, Wa; eu-hym.).

Rumex hymenosepalus is not related to any other species. It is characterized by the tuberous roots, the somewhat succulent stems without axillary branches, large ocreae, fleshy, acuminate leaves, and large, delicate, grainless valves. From R. venosus, with which R. hymenosepalus may be compared on account of the valves, it is easily distinguished by its straight, upright, more vigorous stem, by the lack of axillary branches, much larger, thicker leaves, much smaller fruiting perigonia, etc.
Two varieties, recognizable only in fruiting state and connected by intermediates, seem to deserve designation:

Var. *eu-hymenosepalus* Rech. f., var. nov.—Nux ca. 5 mm. longa. Valvae fructiferae ambitu elliptico-cordatae, apice acutiusculae, latitudine evidenter longiores.


In the list of specimens examined the names of the varieties are added.

Apart from the shape of the fruiting perigonium, the variability of *R. hymenosepalus* is inconsiderable. The leaves are flat or somewhat crisped. *Baker* 296 has broad and short leaves. The type specimen of *R. arizonicus* Britton has very gradually narrowed leaves. It has no ripe fruits, but on account of the locality it may belong to var. *salinus*. *Rumex arizonicus* may be, therefore, an older name for *R. hymenosepalus* var. *salinus*.

Explanations of Figure 9, b.—*Rumex hymenosepalus* Torr. Valves 4 times natural size. From *Jaeger* 908.

27. *Rumex densiflorus* Osterhout. Figure 9, c

breves vel elongati, inferiores iterum remoti, superiores approximati omnes foliis suffurcatis carentes. Inter pedicelllos imprimit in glomerulis inferioribus hic illis ramulus brevis erectus vel ut pedicelli deflexus apice perigonia normalia proferens. Flores saepe purpureo-suffusi, antherae 1.8-2 mm. longae aureae. Pedicelli fructiferi tenui filiformes prope basin (in quarta circiter parte inferiore) insensibiliter articulati, perigonio fructifero (1-) 1.5 (-2) longiores, basin perigonii versus paulo dilatati. Perigonii foliola exteriora lineari-lanceolata ca. 2 mm. longa, basibus interiorem ± laxe accumbens. Valvarum facies saepe minutissime impresso-punctulata. Nux matura atrobrunea, facieaequaliter acuminata, + 3 mm. longa, + 2 mm. lata, in medio circiter latissima.


WYOMING: North Park on edge of Wyoming (Osterhout, Ch, Wa; type). Centennial, Albany Co., banks of the river (A. Nelson 7711, Wa, Ke, La, Be; the two latter approach R. pycnanthus by the narrower valves). Big Creek Park, Hiltons Ranch (Osterhout, La). Medicine Bow Mts., Brooklyne Lake (Mann 170, La). Battle Lake (A. Nelson 4188, La). Battle, Carbon Co., continental divide, 3,000-3,300 meters (Tweedey 4392, Wa; no fr.). Rambler Ranger Station, Hayden Forest, Carbon Co., 2,700 meters (Eggleston 11307, Wa; no fr.). Copperton, 2,610 meters (Tweedey 4391, Wa; leaves shortly rounded or rather cordate at the base).

COLORADO: Region of Gunnison Watershed, Kebler Pass, 3,000 meters (Baker 797, Ca, NY, Ke, Be, De, Z, MW). Cameron Pass, 3,000 meters (Baker, NY; no fr.). Near Pagosa Peak, 3,000 meters (Baker 297, Be). Little Kate Basin, La Plata Mts., 3,450 meters, common in swales (Baker, Earle & Tracy 641, La, Wa, Be, Ke, MW;

The four species R. densiflorus Osterhout, R. pycnanthus Rech. f., R. orthoneurus Rech. f., and R. praecox Rydb. agree so closely as regards the rhizome, some leaf characters, the extremely well-branched panicle, and the form of the fruiting perigonium that they could possibly be referred to one collective species. At present I prefer to maintain them as different species because I have been able to study sufficient material of only one of them, R. densiflorus. Of the other species I have seen one or very few sheets, often from the same collection, so that I can not decide how far the differential characters are individual or specific. The rather abundant material of R. densiflorus that I have studied from different states is, unfortunately, fruiting in only a few cases. I must call attention to the fact that among the specimens referred here to R. densiflorus there are some which in different respects agree with the other species. There is, for example, among the numerous sheets of Nelson 7711 a specimen which differs from the others by narrower, more acute valves, and approaches in this character R. pycnanthus. Several specimens of R. densiflorus, as Colo. Agr. Coll. 3842 and Tweedy 4391, differ from the type by shorter stems, little-branched panicle, and obtuse, relatively broad basal leaves, and approach in these characters R. praecox. The specimens cited by Rydberg, besides the type (Baker, Earle & Tracy 270), differ from the type (Rydberg & Vreeland 6328) by the taller stem, more branched panicle, and longer, more pointed leaves, and thus approach R. densiflorus; both numbers are without ripe fruits. Tweedy 4392 (Hb. Washington) recalls R. orthoneurus in that the lateral nerves of the basal leaves form nearly a right angle with the costa.

For the present I can not pronounce definite judgment on the taxonomy of the Densiflori, but I will mention certain facts that seem to be important for phylogeny.

In the summer of 1933 I discovered in the Eastern Bertiscus (North Albanian Alps) a new Rumex and published it (Mag. Bot.
Lapok 33: 5. pl. 1. 1934; Repert. Sp. Nov. 38: 371. 1935) as *R. balcanicus*. This *Rumex* agrees so well with *R. densiflorus* that it would be, if found in the Rockies, considered perhaps only a variety of that species. The differences lie almost entirely in the outline of the leaves, especially in the lamina being decurrent far along the petiole. Also the occurrence of *R. balcanicus* along subalpine rivers or near springs close to the timber line corresponds exactly with the American species. The discovery of such a similar species in a country so far away makes it probable that the subsection *Densiflori* is an ancient group, formerly widespread, now persistent as a relic in some restricted places in the Balkan Peninsula, but in the Rocky Mountains still in full development, as shown by the variability.

Some species with grainless fruiting perigonia, as the *Aquatici* or *R. domesticus* Hartm., are in some respects very similar to the *Densiflori*, but I consider, not these, but *R. alpinus* L., to be the next related. *R. alpinus* has a creeping rhizome such as the *Densiflori* seem to have; the *Aquatici*, on the contrary, have vertical roots. As the subterranean parts are usually not at all or very fragmentarily represented in herbarium specimens, this subject needs further study. In case my suggestion finds confirmation, the relatively large, obtuse, and partly cordate leaves of *R. praecox*, too, would be considered as an analogy to *R. alpinus*.

*Explanation of Figure 9, c.—Valves of Rumex densiflorus* Osterh., 4 times natural size, from *Nelson* 7711, Wyoming.


Perennis. Caulis erectus 1–2 m. altus, 1–2 cm. crassus, validissimus, inferne strictus superne flexuosus, rufescens, profunde sulcato-canaliculatus, basi residuis petiolorum ochrearumque imbricato-tunica tus, infra inflorescentiam non ramosus. Ochreae albidobrunnescentes hyalinae. Folia basalia magna ampla, ad 40 cm. longa, ad 15 cm. lata, oblongo-ovata vel oblongo-lanceolata, latitudine 2–2.5-plo longiora, lamina infra medium latissima, leviter undata vel fere plana, basi oblique truncata et in petiolum breviter protracta vel late oblique cuneata, apice saepius obtusiuscula, consistentia in vivo ut videtur subcarnosa, in sicco ± tenuiter papyracea. Nervi secundarii foliorum a primo angulo ca. 70°–80° abuentes vix arcuat i fere recti. Petiolus foliorum basaliae laminae longitudinal em subaequans vel superans. Folia caulina non numerosa oblongo-ovata leviter undata, basi rotundata, apice acuta latitudine 2–3-plo longiora, ut folia basalia utrinque glabra et levia, sub lente tantum
minutissime punctulata breviter petiolata; petiolus latitudine folii brevior. Panicula fructifera ampla densa foliis omnino carens; axis inflorescentiae plerumque valde flexuosa. Rami inflorescentiae semper fasciculati terni vel quini, e basi arcuata flexuosi vel stricte erecti vel subpatentes; internodia infima ramorum valde elongata, superiora abbreviata. Florum glomeruli multiflori folii suffulcatus carentes, in statu fructifero infimi remoti, superiores contigui; inter pedicelllos imprimis in glomerulis inferioribus hic illic ramulus brevis erectus vel ut pedicelli deflexus apice perigoniam normaliam proferens. Pedicelli fructiferi tenuiter filiformes prope basin (in quarta circiter parte inferiore) insensibiliter articulati, perigonio maturus (1.5) 2–3-plo longiora, in basin perigonii subalato-dilatati. Perigonii foliola exteriora anguste linearia acuta, 2.5–3.5 mm. longa, basibus interiorum appressa eorumque dimidiam latitudinem semper manifeste superantia. Perigonii folia interiora (valvae) in statu fructifero 5–6 mm. longa, 3–4 mm. lata, ambitu anguste ovato- vel oblongo-triangulata, basi truncata, apice acuta, margine basin versus breviter acutae denticulata ± rarius subintegra, consistencia tenuiter membranacea, colore pallide olivaceo-bruneo vel flavescente, facie tenuiter nervosa nervatione et pinnata in reticulatum transiente. Nervus medianus ceteris validior sed nunquam callifer. Nux matura brunea 3–3.5 mm. longa, ± 2 mm. lata, superne longius, inferne brevius acuminata, paulo infra medium latissima.


UTAH: Brigham Peak, Marysvale, 3,450 meters (Jones 5957, Ca, Bo, La; type of R. subalpinus Jones; leaves short, rounded or slightly cordate at the base). Near head of Bullion Creek, above Marysvale, 3,300 meters (Jones 5893ai, Wa; type; valves acute, sharply denticulate but relatively broad).

R. pycnanthi is very similar to R. densiflorus Osterh. It differs from the latter especially by the narrower, acute valves, distinctly denticulate toward the base. As for the rest, see under R. densiflorus. The original name had to be changed because of an older homonym.

29. Rumex orthoneurus Rech. f. Figure 19

Perennis. Caulis erectus, inferne strictus superne subflexuosus, ad 1 m. vel ultra altus, crasse fistulosus pallide bruneo-virescens,
profunde sulcato-striatus, infra inflorescentiam non ramosus. Ochreae pallide bruneae evanescentes. Folia basalia (15-) 30-50 cm. longa, (4.5-) 9-14 cm. lata, plerumque plana, basi rotundata vel late cuneata, apice acuta, consistencia in vivo ut videtur cariosa, in sicco papyracea, lamina in medio circiter latissima latitudine plerumque 3.5-4-plo longior utrinque glaberrima laevis. Nervi secundarii foliorum recti, omnes fere angulo 90° a mediano abeuntes. Petiolus foliorum basaliun crassiulus laminam latitudine subaequans. Folia caulina inferiora et media basalibus similia sed sensim diminuta brevius petiolata, media infra medium latissima, superioura anguste lanceolata latitudine usque 6-plo longiora. Inflorescentia plerumque aphylla; rami inflorescentiae fasciculati terni usque quini subflexuosi erecti, inferiores elongati iterum ramosi, paniculam elongatam angustiusculam ± compactam formantes. Florum glomeruli multiflori, inimi tantum remoti, superiores approximati, omnes folis suffulcrantibus carentes. Pedicelli fructiferi tenuiter filiformes in quarta circiter parte inferiora insensibiliter articulati, perigonio fructifero circiter 3-plo longiores. Perigonii foliola exteriora 1.5-1.7 mm. longa anguste lanceolata basibus interiorum appressa. Perigonii folia interiora (valvae) in statu fructifero 4 mm. longa et lata, ambitu rotundato-triangularia vel late ovato-rotundata, basi subtruncata vel late rotundata, apice acutiuscula vel obtusiuscula non producta, margine subintegra, facie indistinctius reticulato-nervosa; nervus medianus ceteris multo validior longitudinaliter incrassatus sed non callifer. Nux matura brunea, ca. 2.6 mm. longa, ca. 1.8 mm. lata, vix infra medium latissima.


ARIZONA: Chiricahua Mts., Barfoot Park, rolling, andesitic pine-land, recently lumbered, 2,400 meters (Blumer 1449, NY, Z, Ut, MW).

Rumex orthoneurus is very nearly related to R. densiflorus Osterh., from which it differs by the different proportion of fruits and pedicels, by the smaller fruiting perigonio with different outline, and by the nervation of the leaves. In R. densiflorus a longer, more robust secondary nerve alternates with a shorter and more slender one. In R. orthoneurus these differences are not so decided, so that the leaf seems to have double the number of lateral nerves. The lateral nerves form a right angle with the midrib. See also the discussion of R. densiflorus. This species is known from only one collection. Fragments of R. orthoneurus and R. crispus are mixed in all the sheets I have seen. The root fragments added in most of them do not seem to belong to R. orthoneurus.
Explanation of Figure 19.—Rumex orthoneurus Rech. f., half natural size; Arizona, Blumer 1449; basal leaf added.

30. Rumex praecox Rydb.  Figure 20

Perennis; rhizoma crassum horizontale. Caulis erectus, 20–30 cm. altus, striato-sulcatus. Folia basalia ovata vel elliptica basi rotundata vel late cuneata, apice rotundata, parva, ad 6 cm. longa, 2.5–3 cm. lata, in sicco papyracea, glabra et levia, nervi secundarii angulo ca. 45° a primario abuentes. Petioli foliorum basalium lamina 1.5–2-plo longiores. Folia caulina basalibus similia, sensim minora et praecipue multo brevius petiolata, omnia obtusa, superiora longitudine usque 3-plo longiora. Inflorescentia iam in primo nodo supra basin incipiens, subelongata, angusta, laxiuscula. Florum glomeruli inferiores remoti, superiores approximati, omnes aphylli. Pedicelli filiformes, infra medium indistincte articulati. Perigonii foliola exteriora 2–3 mm. longa, ovata. Perigonii folia interiora (valvae) in statu immaturo ad 5 mm. longa, ovata, integra, ecallosa. Nux submatura ad 3 mm. longa.


COLORADO: Grayback Mining Camp (Rydberg & Vreeland 6328, NY; type).

The second specimen cited by Rydberg differs considerably in vegetative characters, so that I place it under R. densiflorus. For relationship with other species, see the discussion of R. densiflorus Osterh.

Explanation of Figure 20.—Rumex praecox Rydb., half natural size; Rydberg & Vreeland 6328, type.

31. Rumex alpinus L.

Rootstock creeping; stems thick, upright; fruiting panicle much branched, compact; basal leaves large, usually only 1–1.5 times as long as broad, broadly rounded at the apex, deeply and broadly cordate at the base; pedicels filiform, about 3 times longer than the fruit, jointed below the middle; valves ovate, 4–6 mm. long, 4–5 mm. broad, cordate at the base, acute, without any callosity.


Originally from the mountains of Europe and Western Asia. Found only once, as introduced, in America.

NOVA SCOTIA: Yarmouth Co., springy fields and swales, Rockville (Fernald & Long 21052, O).
32. **Rumex domesticus** Hartm.

Perennial; stems strict, upright; basal leaves oblong-ovate or broadly lanceolate, narrowed or rounded at the base, more or less crisped; fruiting panicle compact; pedicels to 2.5 times as long as the fruit, jointed below the middle; valves reniform-rounded, deeply cordate, entire or nearly so, all without a grain or rarely one of them with a very small, globular suggestion of a callosity.


**NEWFOUNDLAND:** Torbay, moist place in pasture (C. D. Howe 1283a, Lu). Irishtown, Bay of Islands (Waghorne, Z).

**NEW BRUNSWICK:** St. Andrews (Fowler, Wa).

**NOVA SCOTIA:** Louisburg, Cape Breton Isl. (Macoun 20215, O). Barrington Passage (Macoun, O). Ball’s Island (Macoun 83946, O). About houses and in fields, Boylston (Hamilton 26675, O).

**ALASKA:** Juneau (Hultén 8291, Lu; Anderson 430, NY). Karluk, common in bogs and brooks (Horne, NY; uncertain, leaves only). Unalaska (Hultén 7532a, Lu). Umnak Isl., Nikolski (Hultén 7110, Lu; uncertain, leaves only).

**MAINE:** South Bristol (Wilson, NY).

**WISCONSIN:** Madison (Shaw School, Ko; Trelease, Lu).

This species has its principal area in the north of Europe, but it occurs also in an apparently spontaneous state in the eastern Pyrenees. I saw one specimen from high Asia and one from eastern Asia, which may belong to the same or a very nearly related species. American specimens mentioned below are in no way different from the North-European. American botanists should try to discover whether this species is indigenous in the New World. Its distribution in North America—Eastern Canada and Alaska with adjacent islands—suggests that it may be so. The Wisconsin specimen may be introduced in any case. Compare the discussion of *R. pallidus* and *R. fenestratus.*

33. **Rumex occidentalis** Wats. Figure 9, d

Perennis. Caulis stricte erectus, humilis vel elatus, gracilis vel validus, internodiis inferioribus et mediiis plerumque elongatis, tenuiter sulcato-striatus, rufescens vel purpureo-suffusus, 50–150 cm. altus, infra inflorescentiam non ramosus. Ochreae pallide bruneae tenuiter membranaceae cito evanescentes. Folia basalia e basi ± profunde cordata oblongo- vel ovato-triangularia apice acuta
Fig. 20. *Rumex praecox* Rydb.
vel obtusiuscula, plana vel leviter undata, parva vel ampla, latitudine 2-2.5-plo longiora, in quartà circiter parte inferiore latissima, consistentia in sicco ± tenuiter papyraceo-membranacea, utrinque glabra et levia. Nervi secundarii a mediano angulo ca. 45°-60° abientes, arcuati. Petiolus foliorum basalium lamina ca. quarta vel tertia parte brevier vel eam subaequans. Folia caulina e basi profunde cordata oblongo-triangulària, latitudine ca. 2-5-plo longiora, ± undata, apice acuta prope basin latissima, brevius petiolata ut folia basalia glabra et levia, subiente tantum minutissime punctulata. Rami inflorescentiae arcuati vel ± stricte erecti, breves, singuli vel infimi paulum elongati bini terniue, inflorescentiam ± angustum fructificationis tempore compactam strictam elongatam, rarius abbreviatam subaphyllam formantes. Florum glomeruli multiflori, foliis suffulcrantibus carentes, omnes approximati, in statu fructifero contigui. Perigoniorum fructiferorum pedicelli tenuiter filiformes, in quartà vel quinta parte inferiore insensibiliter articulati, in basin perigonii breviter infundibuliformi-dilatati, perigonio fructifero 1.5-2-plo longiores. Perigonii foliola exteriora lineari-lanceolata, ca. 2 mm. longa, basibus interioris accumbentia. Perigonii folia interiora (valvae) in statu maturó 4-5 mm. longa, 5-6 mm. lata, ambitu cordato- vel rotundato-triangulària, basi late leviterque emarginata vel fere truncate, apice acuta non vel vix producta, margine sub-integra vel sepius minutissime irregulariterque eroso- vel crenulato-denticulata, colore fusco-bruneo-rufescente, consistentia tenuiter membranacea. Valvae semper omnino ecallosae, facie tenuiter elevate reticulato-nervosae, reticulo subaequali, maculis omnibus elliptico- vel rotundato-rhombicis, marginalibus subminoribus, non vel vix elongatis; nervus medianus ceteris validior. Nux matura atrofusca, 3 mm. longa ± 1.5 mm. lata, apice sublongius, basi brevius acuminata, paulò infra medium latissima.


**DISTRIBUTION:** Nearly all Canada and western United States.

**QUEBEC:** Swamps, Salt Lake, Anticosti (Macoun 23728, O).

**LABRADOR:** Saguenay Co., shore of bay, Petite Rivière Coxipi Bronague (*H. St. John* 90398, O; no fr.).

**ONTARIO:** Twenty-five miles north of Ft. Albany, James Bay (Wilson 53963, O; no fr.). Lake Nipigon, low ground 50° N. (Macoun 23732, O; approaching *R. arcticus* in habit and form of leaves).

**MANITOBA:** In a boggy place, southwest of Brandon (Macoun 12847, O). Swamps and boggy meadows, Lake Winnipegosis, ca. 52° N. (Macoun 23731, O; slender, not ramified). Winnipeg Valley (Bourgeau, Be). Fort Churchill, Hudson Bay (R. Ball 23721, O; in habit near *R. arcticus*, but base of leaves cordate). Churchill (Macoun 79396, O; no fr.; possibly *R. fenestratus*; poor ramification).

**SASKATCHEWAN:** Saskatchewan Plains (Macoun 1272, Ke; like Macoun 23731 and 23721). Low ground, Moose Mt. Lake (Macoun 23733, O; no fr.). Low ground, Cypress Hills (Macoun 23725, O). Near Manitou Lake, along line of Grand Trunk Pac. Railway (Macoun & Herriot 76819, O). Les Coulées, abundant (Bourgeau, Ke; valves larger, more triangular).

**ALBERTA:** Vicinity of Banff, wet ground along Bow River, 1,350 meters (McCalla 2398, Ke; leaves narrow, not cordate). Wet, boggy places, Sand Hills (Macoun 23724, O). Wet places along ... Cardston (?) (Macoun 12911, O; valves larger, more triangular). Rocky Mts., low ground, Kicking Horse Lake (Macoun 23729, O). Headwaters of Saskatchewan and Athabasca rivers (S. Brown 1528, NY; mixed with *R. paucifolius*). Marshes near Sulphur Spring, Crow Nest Pass (Macoun 24673, O; poor ramification, habit of *R. domesticus*).

**BRITISH COLUMBIA:** (Rothrock 62, Ch). Vicinity of Sidney (Macoun 87955, O; perhaps *R. occidentalis* × *fenestratus*?; valves different in size; nutlets sterile).

**YUKON:** Second island in Klondike River (Macoun 91294, O; approaching *R. fenestratus*).

**ARCTIC NORTH AMERICA:** Franklin Exped. (Richardson 23727, O).

**NORTH DAKOTA:** Butte, Benson Co., in ravine (Lunell, Wa, La).

**SOUTH DAKOTA:** Spearfish Canyon, stream side, with *Quercus, Salix, Populus* (Hayward, NY). Bank of Little Spearfish Creek (Murdoch, Ch).
MONTANA: Sedan, Gallatin Co., east of Flathead: (W. W. Jones, Ca). Swampy ground near Bozeman, 1,350 meters (Blankinship 454, Wa, Ch, Be, St). Along Swiftcurrent Creek, below Lake McDermot, 1,350 meters, boggy meadow (Standley 16875, Wa). Vicinity of St. Mary Chalets, foot of St. Mary Lake, 1,350 meters, wet thicket (Standley 17391, Wa). Davaher Ranch, Flathead National Forest (Kirkwood 2396, Ca; stem short, little ramified; thick, leathery basal leaves, the nerves of the upper surface immersed). Billings (C. M. Patten, Ch).


COLORADO: Gunnison, 2,300 meters (C. F. Baker 903, Wa, Ca, La, SL, NY, Ke, MW; type of R. Bakeri Greene). Gunnison (Shear 5073, Wa). Mountain View, 2,900 meters (Clements 395, La, Ko; mixed with R. fenestratus; Wa, Be). Without locality (Engelmann, Be). Fort Collins, 1,500 meters (Towson, La). Vicinity of Georgetown, banks of Clear Creek (Patterson, Ch).


TEXAS: Dallas (J. Ball, De; strange habit, stem very tall and stout, upper leaves long and crisped).

IDAHO: About Forest, Nez Perce Co., 1,050 meters (Heller 2481, Z; approaching R. fenestratus).


WASHINGTON: Rock Island, Kittitas Co., 1,850 meters (Sandberg & Leiberg 447, Be, approaching R. fenestratus; Le).

OREGON: River bottoms (Howell, Be, Bu; approaching R. fenestratus). Near Crow Creek, Wallowa Co. (Sheldon 8497, Wa; perhaps R. fenestratus).
NEVADA: Pine Creek, High Ranch (Greene, photo. MW; type of \textit{R. gracilipes} Greene). Toiyabe Forest, 1,800–2,400 meters, Big Creek, Kingston Canyon, meadow (Hitchcock 817, Wa).

CALIFORNIA: Goose Lake (\textit{R. M. Austin} 419, Wa). Santa Barbara (Elmer 3932, MW). Fall River Lake, Shasta Co. (Baker, Ca; approaching \textit{R. fenestratus}). Mt. Shasta, Siskiyou Co., meadow at Sisson, 1,050 meters (Hall & Babcock 4065, Ca).

LOCALITY INDEFINITE: Rocky Mts., Lat. 39°–41° (Hall & Harbour 499, De, Bo; leaves small, scarcely cordate, panicle rather sparsely branched).

\textit{Rumex occidentalis} is highly variable as regards the size, thickness of stem, ramification of inflorescence, and, especially, form of leaves. Also the size and outline of the valves and the size of the nutlets are variable. The demarcation of this species and the question whether it is a unit or whether certain combinations of characters may be selected as indicating separate types must be closely examined.

Species of \textit{Lapathum} with perennial, vertical roots, without axillary branches, with leaves cordate at the base, and with grainless, entire valves (subsect. \textit{Aquatici}) are rather closely dispersed over the temperate zone of the northern hemisphere so far as the considerable need for humidity of this group of species is fulfilled. As in this group neither grains nor dentation of the border of the valves ever develop, it is clear that all these forms have a homogeneous stamp as to the formation of the fruits, in contrast to the variability of the vegetative organs. This unity goes so far that the inclusion of all these forms in one collective species could be defended. This collective species would have to bear the name \textit{Rumex aquaticus} L. as the oldest, in an extended sense. Actually the older authors as, for instance, Pursh, Campder, and Meisner, did not detect a difference between the Old World and the New World representatives of the \textit{Aquatici}, but these authors had not well defined their \textit{Rumex aquaticus} and had included a lot of elements belonging to other groups of species. This uncertainty arises concerning the North American \textit{Aquatici} by the appearance in the older American literature of representatives of \textit{Aquatici} at the same time under the names of \textit{R. aquaticus}, \textit{R. domesticus}, and \textit{R. longifolius}. Watson is the first who makes a separating line between the representatives of the Old and the New World \textit{Aquatici} by creating his \textit{R. occidentalis}. 
The extraordinary variability of *R. occidentalis* was not considered by Trelease in the first synoptical account of the American *Rumex* species, but he recognized the close relationship of *R. arcticus* to *R. occidentalis* by placing Hooker's *R. domesticus* var. *nanus* near *R. occidentalis*. It was reserved to Greene to describe six further species of the relationship of *R. occidentalis*. If in this work only two of them appear and that in an altered sense (*R. fenestratus* and *R. fenestratus* var. *procerus*), it does not detract from that author's sharp power of observation, but only emphasizes the lack of critical weighing, which is occasionally to be found in his works.

My present attempt at interpretation of the American *Aquatici* is based on the following observations. The widest range is occupied by forms with an average length and breadth of the valves of 5 mm.; that is, from New England in the east to Montana (and occasionally still farther) in the west and in the Rocky Mountains south to New Mexico. In the west this area is joined by a zone exclusively or at least prevailingly inhabited by forms with large fruits, the valves averaging 9 mm. in size. The distribution of these large-fruited forms is from western middle California in the south to Alaska in the north, with especially abundant occurrence in the northwestern United States and southwestern Canada (Vancouver Island). There are wide interruptions in the ranges of these forms in northwestern Canada.

In a surprising way, forms with large fruits appear also on the easternmost edge (Labrador) of the continent, differing only slightly from the western by a more triangular-acute form of the valves. This fact deserves special consideration in a phytogeographic respect, since it shows analogies in other subsections: among the *Salicifolii* the appearance of the east-American *R. pallidus* Bigel. in Alaska; among the *Maritimi*, the appearance of the likewise east-American *R. persicarioides* L. sensu St. John in California and Oregon; further the appearance of *R. domesticus* Hartm. in eastern Canada and Alaska, but whether it is wholly indigenous, it must be admitted, is open to question. I unite the *Aquatici* with small fruits under the name *R. occidentalis*, without regard to whether they have tall or low, stout or slender, little- or much-branched stems, long or short, broad or narrow, distinctly or not distinctly (or occasionally not at all) cordate leaves, and long or short petioles, since all these characters apparently neither parallel each other nor are limited to certain regions, but in a high degree depend on such circumstances as humidity, elevation above sea level, etc.
With increasing elevation above sea level the stem becomes usually more delicate, lower, and less branched, just as in more northern countries. At the same time the leaves become narrower and less distinctly cordate. This last modification seems to appear also when humidity is considerable.

In some cases it is not easy to distinguish *R. arcticus* from forms of *R. occidentalis* of extreme situations. *R. arcticus* is distinguished from these by small leaves which have a thick consistency, by a succulent and more flexuous stem, by thick and not very distinct nerves of the valves, and by an often very intense red color of the whole plant, even when the base of the leaves of *R. arcticus* is occasionally a little cordate.

The forms with large fruits I unite under the name *R. fenestratus* Greene (originally described from Vancouver Island). *R. confinis* Greene from Idaho I must reduce to synonymy. *R. procerus* Greene I add as a variety to *R. fenestratus*; it occupies the most southern stations that lie remarkably low for these latitudes, and is characterized by an especially tall and robust habit. I have had to create a new name for the Labrador plant mentioned before, with large fruits and acute valves, and call it *R. fenestratus* var. *labradoricus*. The other species of *Aquatici* created by Greene I have reduced to synonymy under *R. occidentalis*.

*Explanation of Figure 9, d.—Valves of Rumex occidentalis* Wats., 4 times natural size, Winnipeg Valley, *Bourgeois*.

34. *Rumex arcticus* Trautv. Figure 21

Radix perennis crassa. Basis caulis rudimentis emarcidis petiolorum et ochrearum imbricato-tunicata. Caulis humilis simplex—inflorescentia tantum interdum breviter pauciramosa—stricte erectus vel subflexuosus, paucifolius, 10–40 cm. altus, crebre tenuiter sulcato- striatus, saepe purpureo-suffusus. Ochreae bruneae evanescentes. Folia basalia parva ca. 6–12 cm. longa, 2–3 cm. lata, utrinque ut tota planta omnino glabra et levia, in vivo ut videtur carnosa, in sicco coriacea vel crasse membranacea, plana vel leviter undata, marginae saepe crispata, ambitu ovato-lanceolata vel oblongo-lanceolata, basi leviter cordata vel truncata vel ± late euneata, saepe paulo obliqua, apice obtusiuscula vel acuta, longitudine 3–5-plo longiora, infra medium latissima. Nervi laterales foliorum saepe vix conspicui, angulo valde variabili (ca. 40° usque fere 90°) a mediano abuentes. Petiolus foliorum basaliu lamina plerumque 1⁄₂–1⁄₂ brevior, rarius eam subaequans. Folia caulina inferiora basalibus subsimilia sed
proportione minora angustiora brevius petiolata; folia caulina superiore saepe anguste linearis-lanceolata, latitudine 6–8-plo longiora. Rami inflorescentiae—si evoluti—tenues breves arcuato-divergentes flexuosi, paniculam parvam laxiusculam foliis omnino fere carentem formantes. Florum glomeruli saepe depauperati, rarius multiflori, in statu florendi ± approximati, in statu fructifero ± remoti. Pedicelli fructiferi filiformes, in tertia vel quarta parte inferiore insensibiliter articulati, basin perigonii versus sensim subalato-dilatati, perigonio maturo ca. 1–2-plo longiores. Perigonii foliola exteriora basi late connata, ovato-lanceolata, obtusiuscula vel subacuta, 1.5–2 mm. longa, basibus interiorum arcte appressa. Perigonii folia interiora (valvae) in statu fructifero ca. 4–5 mm. longa, 3–4 mm. lata, ambitu ovata, consistentia tenuiusculae membranacea, colore brunea vel purpureo-suffusa, basi rotundata apice obtusa vel acutiuscula, margine subintegra, facie tenuiter et subaequaliter reticulo-corporis, nervo mediano ceteris validiore sed minime quidem callifero. Nux matura atrobrunea ca. 2 mm. longa, ca. 1.3 mm. lata, basi breviter, apice longius acuminata, infra medium latissima.


DISTRIBUTION: Arctic-circumpolar.


ALASKA: Yukon District (F. Anderson, St). Vicinity of Norton Sound, north of Nome (Rhodes, Ca.; not branched; stem 60 cm. high; most leaves suddenly narrowed). Port Clarence (Kjellman, St). St. Michael (Setchell, Ca). Shishmaref Inlet, near Kotzebue Sound (Chamisso, Be). Survey Camp No. 1, Kotzebue (W. E. B., Ca). Nome (Piper, P; Blaisdell, Ca). McKinley National Park, head of Savage River, narrow valley between high mountains, along stream-overflowed islet, 1,000 meters (Ynes Mexia 2048, Ca; lower leaves broad and short but not cordate). McKinley National Park near
Fig. 21.  *Rumex arcticus* Trautv.

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center of north boundary, 700 meters, slopes west of Wonder Park (Mexia 2244, Ca, St; little-branched). St. Lawrence Island (Kjellman, St). Nunivak Island, damp ground (Macoun 24490, O). Kussiloff (Evans 694, Wa; stem to 70 cm. high; panicle branched).

LOCALITY UNCERTAIN: "Northwest America" (Seemann 1798, Ke).

Rumex arcticus is characterized by its short, somewhat stout or succulent stem, almost simple inflorescence (rarely with a few short, slender and flexuous branches), and small, somewhat thick basal leaves, almost cuneate at the base. The whole plant, or at least the stem and fruits, is often purple. Specimens doubtful in one or another respect, showing not all the characters together, are known from Canada and Alaska. Since the material available is poor and mostly incomplete, I can not decide whether these specimens should be considered as connecting forms between R. occidentalis and R. arcticus at the limit of their areas or as hybrids. The geographic distribution of this species is arctic-circumpolar, the only example of this type of distribution in the subgenus Lapathum.

Explanation of Figure 21.—Rumex arcticus Trautv., half natural size: (a) habit, Alaska, Mexia 2048; (b) basal leaf, Canada, Anderson 468; (c) basal leaf, Canada, Stringer 15953; (d) basal leaf, Canada, Cox & O'Neill 416. Valves 4 times natural size, from Stringer 15935.

35. Rumex fenestratus Greene. Figure 22, a

Perennis. Caulis stricte erectus saepe valde elatus interdum plusquam 2 m. altus pallide roseo-flavescens (color rhei), sulcato-striatus, inflorescentia excepta non ramosus. Ochreae pallidae hyalinae cito evanescentes. Folia basalia in sicco tenuiter vel crasse papyraceo-membranacea, magna (ex auctore ad 15 cm. lata) latitudine ca. 2-plo longiora, supra basin latissima, basi profunde cordata, apice acuta vel acutiuscula, ambitu ovato- vel oblongo-ovato-triangularia, leviter vel valde undato-crispata vel fere plana, subitus imprimis ad nervos cum petiolis saepe papilloso-scabra; nervi secundarii a mediano angulo ca. 70°–90° abuentes, demum prorsus curvati. Petioli foliorum basalium laminae longitudinem fere aequantes. Folia caulina e basi profunde cordata oblongo-triangularia, apice acuta, latitudine plerumque plusquam triplo longiora, supra basin latissima, leviter undata, breviter petiolata, levia, sub lente tantum minute papilloso-punctulata. Panicula ampla densiuscula; axis inflorescentiae saepe ± flexuosa; rami singuli rarius bini ternive, inferiores partim iterum ramosi ± elongati, superiores breves simplices vel breviter ramosi, omnes tenues subflexuosi, erecto-patentes vel leviter arcuati. Florum
glomeruli multiflori, foliis sulfulcrantibus carentes, in statu fructifero contigui, perigoniorum fructiferorum pedicelli tenuiter filiformes, perigonio maturo ± 1.5-plo longiores, in tertia vel quarta parte inferiore insensibiliter articulati, in basin perigonii breviter infundibuliformi-dilatati. - Perigonii foliola exteriora anguste lineari-lanceolata, ca. 3 mm. longa, emarginationi interiorum accumbentia. Perigonii folia interiora (valvae) in statu fructifero 10 mm. longa, 7–9 mm. lata, ambitu rotundato-cordata basi ± profunde emarginata, apice acutiuscula vel rotundato-acuminata, nunquam producta, margine subintegra vel saepius — imprimis basin versus — minutissime irregulariterque erosulo-denticulata, colore pallide carneo-bruneo, consistencia tenuiter membranacea. Valvae semper omnino ecallosae, facie tenuiter elevate reticulato-nervosae, reticulo aequali maculis marginalibus minoribus non vel vix elongatis; nervus medianus ceteris validior. Nux (non perfecte matura) fusca 3.5–4 mm. longa, ca. 2 mm. lata, utrinque fere aequaliter acuminata, paulo infra medium latissima.


DISTRIBUTION: Alaska to northwestern United States and northeastern Canada.

LABRADOR: (Var. labr.). Straits of Belle Isle, marshy belt behind the strand, Blanc Sablon (Fernald & Wiegand 3288, O, Ke).

QUEBEC: (Var. labr.). Ile d’Anticosti, Lac Salé, dans la prairie naturelle (Marie-Victorin & Rolland-Germain 27339, 27151, St). Garden at Ceravalla Bay, Lake Melville, common (Wetmore 102933; no ripe fr.). Shores of Naskanpi River, Grand Lake, Lake Melville Distr., common (Wetmore 102934, O; no ripe fr.).


ALASKA: Rodman Bay, Baranoff (Stephans 106, Ca). Open places, shores of Behm Canal (Gorman, Ca). Juneau, near beach (J. P. Anderson 2A-215, Lu). King Cove (Eyerdam 1735, Lu; no ripe fr.).
River bottom, Kelp Bay; Baranoff Isl. (Walker 795, Ca, St; no ripe fr.). Matanuska, wet roadside (Anderson 891, MW; 1040, Lu; no ripe fr.). Vicinity of Karluk, Kodiak Isl. (Rutter 75, St, Ko; no ripe fr.). Kodiak, Sitkalidak Isl., Port Hobron (Eyster dam 189, Lu). Jakobi Island (Anderson 1358, Ch). Unalaska (Eyster dam 2486, 2450, Lu; Hultén 7654, Lu). Makuslin Bay, Unalaska, along stream (E. C. van Dyke 183, G; no ripe fr.). Unimak Isl., False Pass (Eyster dam 2222, 2233, Lu; no ripe fr.). Akutan (Norberg 429, Lu; no ripe fr.). Umnak Isl., Nikolski (Hultén 7110, Lu; no ripe fr.). Amlia Isl. (Eyster dam 1187, Lu; leaves only). Attu (Hultén 6122, Lu; leaves only).

MONTANA: Ronan, 900 meters, Middle Temperature Life Zone (M. E. Jones, G; no fr.). Libby Creek (Blankinship, SL).

IDAHO: Corral, Camas Prairie, thicket edge, 1,710 meters (Macbride & Payson 3812, NY, Wa, Ca, UW). Wet meadows around Lake Pend d’Oreille (Leiberg 562, SL, Lu; type of R. confinis Greene). Bitter Root (Sandberg, Ch). Coopers(?) (A. I. Mulford, SL). Moist and wet places along Paradise Creek, common (Henderson, Wa). Moscow, Latah Co. (Abrams 728, Ca; no fr.). Common in wet copses, valley of Big Potlatch River, Nez Perce Co. (Sandberg, etc. 364, Ke). Common along Green Horn Creek near Hailey (Tidestrom 2753, Wa; no fr.).


OREGON: Portland (Henderson, P). Portland, Lower Albina (Sheldon P, Ch, Wa). Wet meadow on Red Blanket Creek, near Prospect, 1,050 meters (Applegate 2552, Wa; no fr.). Ross Slough, Coos Co. (H. H. Smith 3680, Ca; no fr.). Vicinity of Laidlaw, Crook Co. (Whited, Wa; no fr.). Big Sheep Creek, Wallowa Co., 1,410 meters (Sheldon 8616, SL). Shore of Klamath Lake, near Modoc Point (Coville 1332, Wa; no fr.). Silver Lake to Ft. Klamath (Furlong, etc., Ca; no fr.). Klamath Indian Reservation, Valley of

CALIFORNIA: Lassen Co., Amadee (B. Davy, Ca). Amadee, Honey Lake Valley (B. Davy, Ca; proc.). San Francisco (Andersson, St; proc.; leaves only). Lake Merced, San Francisco (Eastwood, Ch). Coloma (Andersson, St; proc.). Goodyear, Solano Co., common in marshes (Baker 3219, MW, photo.; type of R. procerus Greene). Northern Coast Ranges, brackish marsh near Samoa, 0-150 meters (Tracy 3148, Ca; proc.). Along streamlet, Bold Mt. between High Prairie and Snow Camp, Humboldt Co., 1,050 meters (Tracy 4578, Ca; no fr.). Berkeley, marshes (B. Davy 722, Ca; proc.). Warner Mts., Modoc Co., 2,190 meters, meadows, head of North Fork, Parker Co. (Taylor & Bryant, Ca; no fr.). Willow Creek (Nutting, Ca). Without locality (Andersson, St; Bolander, Wa; both proc.).

Rumex fenestratus differs from R. occidentalis by its twice as large fruiting perigonia and nutlets. In size and form of the leaves, whether crisped or not, and in outline of the valves, both species are variable.

The specimens from Vancouver Island are distinguished by the thick consistency of their leaves and by having their nerves papillosepubescent beneath. I can not see the differences suggested by Greene in his descriptions concerning articulation of pedicels and outline of valves, or at least they are not sufficient to distinguish the insular and continental plants.

As to the relations between R. fenestratus and R. occidentalis, and the geographic distribution, see the discussion of the latter species.

Two forms seem to deserve separation:


This variety is limited to the western middle sections of California, that is, to the most southwestern part of the area of R. fenestratus. It occurs there “in wet, boggy depressions among the coast hills, about San Francisco Bay and Monterey,” in exceedingly low localities compared with the extremely southern situation. The distinction from the type does not seem to be very clear. (See above, the specimens marked “proc.”)
Var. labradoricus Rech. f., var. nov.—Differt a typo imprimis valvis sublongioribus, ambitu saepe subtriangularibus, plerumque acutis.

This variety is not clearly distinguished from the type. It occupies the most eastern parts of Canada and is separated from the principal area of the type by a large zone inhabited by R. occidentalis. (See above, the specimens marked “labrad.”)

Explanation of Figure 22, a.—Valves of Rumex fenestratus, 4 times natural size; Idaho, Macbride 3812.

36. Rumex Patientia L.

Somewhat similar to R. crispus, from which it differs by its usually taller habit, larger, pale green, not so distinctly crisped leaves, these broadest below the middle, petioles flat on the upper side, larger, more cordate valves with proportionately smaller grains and larger nutlets.


A rather polymorphic species, originally from southeastern Europe and Asia. Most American specimens belong to the subsp. eu-Patientia Rech. f. op. cit. 246, with only one valve grain-bearing; but some of them approach by the still larger fruiting perianths, with three grains of unequal size, the subsp. orientalis (Bernh.) Danser; cf. Rech. f. op. cit. 253.

CANADA: Waste places, Ottawa (Macoun 5876, O). Roadside and fields near Belleville (Macoun 23760, O; approaching orientalis).

DISTRICT OF COLUMBIA: Washington (Steele, Ko; approaching orientalis).

WISCONSIN: Blue Mounds (Fassett 2955, La).

IOWA: Fayette (Fink, G).

KANSAS: Waste places, Riley Co. (J. B. Norton 449, La, UW; approaching orientalis).

MISSOURI: Courtney, waste ground (Bush 9789B, NY).

UTAH: Lehi, moist bottom (Goodding 1167, Wa, La).

WASHINGTON: Waitsburg (Horner 184, P). Spokane (Turesson, La).
37. *Rumex crispus* L.

Stem straight, erect, without axillary branches; leaves cuneate at the base, wavy-margined; petioles somewhat canaliculate on the upper side; panicle elongated, the whorls usually dense and approximate, the pedicels about 1.5 times longer than the fruit; valves round-ovate, subcordate, the margin entire or minutely erose, usually with 3 equal or unequal grains, rarely with only one.

**SYNONYMY:** L. Sp. Pl. 335. 1753; Pursh 247. 1816; Campdera 95. 1819; Hook. 129. 1840; Meisn. apud DC. 44. 1856; Wats. 9. 1880; Macoun 416. 1883; Trelease 84. 1892; Britt. & Brown 551. 1896; Small 370. 1903; Piper 225. 1906; Gray 355. 1908; Woot. & Standl. 192. 1915; Rydb. R. 232. 1922; Jepson 292. 1923; Tidestrom 160. 1925; Rydb. P. 280. 1932; Rech. f. Vorarb. Monogr. Rumex 3: 44. 1933.

A polymorphic species as to the form of leaves, size of fruiting perigonia, grains, etc.

Indigenous in Europe and Asia, introduced to all parts of the world and partly naturalized. In America students have generally assumed that it has only been naturalized, but, as the data cited from labels indicate, this seems open to question, especially as concerns those from the Rocky Mountains. In the following citations habitat for specimens noted by the collectors as from waste places or clearly as "weeds" has been omitted, only natural habitats being cited.


**NOVA SCOTIA:** Main Station (*H. St. John*, Ko, Ke).

**ONTARIO:** Kingston (*Fowler*, Wa).


**NEW HAMPSHIRE:** Philbrook Farm, Shelburne (*Deane*, Wa).


**CONNECTICUT:** Vicinity of Green's Farms (*Pollard* 74, Wa).

**NEW YORK:** Vicinity of Clove, Dutchess Co. (*Standley & Bollman* 12338, Wa).

**DELAWARE:** Greenbank (*Commons*, NY).
MARYLAND: Below Great Falls, Bank of C. & O. Canal (Maxon 6331, Wa).


NORTH CAROLINA: Ocracoke Isl., Hyde Co. (Kearney 2295, Wa).

GEORGIA: McDuffie Co., along small stream in the open northwest of Thomson (Bartlett 2595, Wa). Savannah (Kolthoff). Savannah, Chatham Co. (Moldenke 1189, St, SL).

ALABAMA: Dry, open prairies, Marion (C. Mohr, Wa).

OHIO: Jamestown (Wooton, Wa).

MICHIGAN: Vicinity of Michigan Biological Station (F. C. Gates, MW, Ch).


SOUTH DAKOTA: Deadwood, creek banks (Rydberg 5, NY, NW, Wa).


ARKANSAS: Without locality (Rafinesque, De).

KANSAS: Pittsburg (Rydberg & Imler 184, NY). Hoisington (Rydberg & Imler 1293, NY).

MISSISSIPPI: Columbus (Mohr, Wa). Starkville (Tracy, SL).


MONTANA: Kalispell (Blankinship, SL). Low thickets along Swiftcurrent Creek, below Lake McDermott, 1,350 meters (Standley 15539, Wa).


NEVADA: Kings Canyon, Ormsby Co., 1,700–2,000 meters (Baker 1201, SL, Ca, Bu). On slopes, Glenbrook on Lake Tahoe, 1,860 meters (Tidestrom 10293, St). Corey Canyon, Wassuk Mts., 2,040
meters (Tidestrom 10123, SL). Reno, 1,350–1,500 meters (Hitchcock 440, Wa).


JAMAICA: Farm Hill (Orcutt 3337, Ca).


38. Rumex conglomeratus Murr.

Lower leaves cordate at the base, plane; branches of the panicle divergent; whorls nearly all with a leaf, remote; pedicels usually not longer than the fruit; valves 2.5–3 mm. long, entire, each bearing a large grain.

SYNONYMY: Murr. Prodr. Fl. Gött. 52. 1770; Meisn. apud DC. 49. 1856; Wats. 9. 1880; Trelease 90. 1892; Britt. & Brown 551. 1896; Small 371. 1856; Piper 226. 1906; Gray 356. 1908; Jepson 292. 1923.

A weed of European origin, naturalized in extra-tropical parts of the New World.

BRITISH COLUMBIA: Vancouver Isl., Bamfield (Anderson 7223, P). Nanaimo (Macoun 83938, Ch).

VIRGINIA: Near Ocean View Station, Norfolk (Coville 3, Wa). Norfolk (Curtiss, Ch).

NORTH CAROLINA: In oriente...locis vastis (McCarthy, Wa).

ARIZONA: Hot Springs (Toumey, 343d, Wa). Phoenix (Toumey 343b, Wa).

TEXAS: Wet, sandy ground, Huntsville, Walker Co. (E. J. Palmer 12035, La, Ca, Br).


HAITI: Vicinity of Mission, Fonds Varettes, 1,000 meters (Leonard 3813, Wa).
39. **Rumex sanguineus** L.

Lower leaves cordate at the base, plane; branches of the panicle divergent, only the lower whorls with a leaf, all remote; pedicels about 1.5 times as long as the fruit; valves 3–3.8 mm. long, entire, only one with a grain, the others usually grainless.

**SYNONYMY:** L. Sp. Pl. 334. 1753; Pursh 247. 1816; Campderia 65 and 94. 1819; Hook. 130. 1840; Meisn. apud DC. 49. 1856; Macoun 417. 1883; Trelease 90. 1892; Britt. & Brown 551. 1896; Small 371. 1903.

Though this species is mentioned by many American authors as introduced from Europe, I have seen only one American specimen. Perhaps it has sometimes been confused with other species, especially *R. conglomeratus*.

**OREGON:** Auf fremder Erde (ballast) in Linnton bei Portland (*Suksdorf* 1699, P).

40. **Rumex Britannica** L.  Figure 22, b

Perennis. Caulis validus stricte erectus, profunde canaliculato-sulcatus, saepe purpurascens, 60–160 cm. altus, infra inflorescentiam non ramosus. Ochreae bruneae maiusculae cito evanescentes. Folia basalia ambitu oblongo-lanceolata usque ad 50 cm. longa, ad 20 cm. lata, latitudine 3–4-plo longiora, in vel infra medium latissima, basi oblique truncata vel late cuneata raro rotundata, apice acutiuscula vel rotundula, subplana vel ± undata et margine insuper minute crenato-crispata, utrinque glabra et levia vel subtos ad nervos scabriuscula, consistentia in sicco crasse membranacea vel tenuiter coriacea rigidula; nervi secundarii foliorum fere recti vix curvati, a primitario angulo ca. 60°–80° abuentes, subtos valde prominentes. Petiolus foliorum basalia laminam ± aequans. Folia caulina inferiora e basi rotundata vel latiuscule cuneata lanceolata, latitudine ca. 4-plo longiora, basin versus latissima, apicem versus sensim angustata; petiolus latitudinem folii ± aequans. Folia caulina superioira anguste lineari-lanceolata subplana breviter petiolata. Rami inflorescentiae plerumque breves e basi arcuata leviter divergentes ± stricte erecti superiores singuli simplices, inferiores folii saepe elongati saepe fasciculati plerumque terni iterum ramosi, paniculam angustam brevem vel elongatum in statu fructifero ± compactam formantes. Florum glomeruli multiflori omnes plerumque approximati fructificationis tempore contigui, pedicelli fructiferi validiusculi, in quarta circiter parte inferiore tenuiter articulati, basin perigonii versus
sensim paulo dilatati, perigonio maturo 1.5–2 (–2.5) -plo longiores. Perigonii foliola exteriora ovato-lanceolata latiuscula subobtusa, 2–2.5 mm. longa, basibus interiorum accumbentia. Perigonii folia interiora (valvae) in statu fructifero 4-6 mm. longa, 4.5–7.5 mm. lata, longitudine plerumque evidenter latiora, ambitu cordato- vel reniformi-rotundata basi ± late emerginata, apice rotundata vel latissime rotundato-acuminata, margine subintegra vel imprimis basin versus minute et irregulariter crenulato-denticulata, colore carneo-bruneo vel stramineo, iuniora saepe purpureo-suffusa, consistentia rigide membranacea. Valvae facie subaequaliter et valde prominenter reticulato-nervosae, omnes calliferae; nervi basi (quo ex callo excurrunt) saepe incrassati. Calli subaequales elongato-fusiformes, semper a basi valvae aliquantum remoti ideoque nervo mediano quasi stipitati, apice in nervum medianum acute transientes, dimidia longitudine valvae semper evidenter longiores, leves. Nux matura brunea 3.5 mm. longa, ca. 2 mm. lata, utrinque subaequaliter acuminata, in medio circiter latissima.


ILLUSTRATIONS: Trelease, pl. 21. 1892; Britt. & Brown 550. 1896 (very bad).

DISTRIBUTION: Lowland districts of Canada and eastern and middle United States.

NEWFOUNDLAND: Region of Humber Arm, Bay of Islands, brackish swamp (Fernald & Wiegand 3287, Ke, O; borealis).

NOVA SCOTIA: Sable Island, at Life Saving Station, swampy edge of fresh-water pond (St. John 1200, O, Wa, Ko; borealis). Bridge-water (Macoun 83951, O). Sable Island, very rare (Macoun 22595, O). Common in swamp, Boylston (Hamilton 24676, O). Digby (Macoun 83952, O). By a lake near Louisburg, Cape Breton Isl. (Macoun 20215, O).

NEW BRUNSWICK: Gloucester Co., brackish margin of Tête-à-Gouche River, Bathurst (Williams & Fernald 69122, O; borealis).

PRINCE EDWARD ISLAND: Marshes near Tracadie (Macoun 23695, O).
QUEBEC: Magdalen Isl., wet bogs and mossy pond margins among the sandhills between East Cape and East Point, Coffin Isl. (Fernald, Long & St. John 7329, NY, O, Wa, Ko; borealis). Ste. Thérèse, Lac Tourbeux (P. Ls.-Marie, MW). Tourbières de St. Hubert, vicinity of Longueuil (Victorin 9770, Wa). Ile du Bic, cordon littoral (Rousseau 30059, St; borealis). Saguenay Co., River Etamamion, Charny (St. John 90399, O; borealis). Along the Pêche River, above Wakefield (Macoun 60813, O). Low ground along brooks and in river marshes, mouth of the Restigouche (Macoun, O). Low ground near Matane Gaspé (Macoun 23694, O). Below Cap à l’Aigle, Port à Persis (Macoun 67752, O). In swamp, Granby (Scott 12905, O).


RHODE ISLAND: Olneyville (Congdon, Ch).


OHIO: Cleveland, wet places (Krebs 584, Be). Perkins, Erie Co. (Mosely, Wa).

INDIANA: Swamps and marshes, Clarke (Umbach, Wa). Muncie (Brady, Ca). Pine (Duesner, Ch).
WISCONSIN: Without locality (Schuette, NY). Greenfield, in water (? NY). Fort Howard (Schuette, Ch).

ILLINOIS: Peoria (Mendel, H). Ringwood (Vasey, UW).


IOWA: Kossuth Co. (Cratty & Pammel 584, Wa, Be). Wet ground, Fayette Co. (Fink 540, Wa). Hanging bog, 3 miles southwest of Laboratory, Lake Okoboji, Dickinson Co. (Conard, MW).

NORTH DAKOTA: Camp Lake, Underwood (Metcalfe 416, Wa).

SOUTH DAKOTA: Wet places along Sioux River, Brookings (Williams, Wa).


Rumex Britannica is not related to any other American species but only to the European R. Hydrolapathum Huds. This relationship was already recognized by Gray, who called the American plant R. Hydrolapathum var. americanus. R. Hydrolapathum shows a similar nervation of leaves and also elongate and narrow valve grains, but is easy to distinguish by its longer basal leaves, of more leathery consistency, and by its triangular, acute valves.

The name R. Britannica is used here in the sense of Trelease and subsequent authors. The identity of this plant with Linné’s R. Britannica is not clear to me. Earlier authors seem to have confused it with R. altissimus Wood. Perhaps it would be more cautious to use the name R. orbicularis Gray.

Mr. H. W. Pugsley of London kindly undertook to examine for me the specimen of R. Britannica in the Linné Herbarium. He wrote that the specimen deposited there under the name R. Britannica is not absolutely a type, because there is no evidence of the date at which it was inserted in the herbarium. It consists of a small branch with narrow leaves, without axillary branches. The fruiting pedicels are 7–15 mm. long and the valves triangular, about 5 mm. long and broad. These characters for the most part seem not to agree with R. Britannica of authors.

In the northeastern parts of its area (Nova Scotia, Quebec), R. Britannica occurs usually in a form differing in some respects
from the type. I am not sure whether this represents a geographic race or rather an occasional modification.

Var. borealis Rech. f., var. nov.—Differt a typo caule humiliore, saepe crassiore, panicula fructifera breviore magis compacta ramis paucis brevibus appressis vel subnullis, foliis multo minoribus proportione angustioribus, basi apiceque subaequaliter angustatis, consistentia crassioribus, in medio circiter latissimis, basalibus extremo apice saepe breviter rotundatis, valvis fructiferis sublatioribus, ad 8.5 mm. latis.

Specimens belonging to this variety in the list of specimens examined are noted as “borealis.”

Explanation of Figure 22, b.—Valves of Rumex Britannica L., 4 times natural size, from Macoun 83951.

41. Rumex obtusifolius L.

Lower leaves broad, deeply cordate at base, flat, the upper rounded at base, narrower, lanceolate; branches of the panicle divergent; only the lower flower verticils with leaves and remote; pedicels slender, to 2½ times as long as the fruit, jointed near the base; valves 5–6 mm. long, usually one of them bearing a grain, with two or three often very pronounced teeth on each side.

Indigenous in Europe, introduced to North and South America, South Africa, eastern Asia, etc. The species is very polymorphic and is represented in Europe by four subspecies. Most of the American specimens belong to the West European subspecies agrestis (Fries) Danser (see Rech. f. op. cit. 1: 45), characterized by leaves somewhat papillous on the under side along the nerves and by large (about 6 mm.) fruiting perigonia with toothed segments, usually one of them bearing a grain. Only one specimen belongs to the Central European subsp. transiens (Simonkai) Rech. f. op. cit. 52, characterized by somewhat smaller fruiting perigonia with 3 usually unequal grains and shorter fruit segments.


**ALASKA:** Juneau, near beach (*Anderson 2A-285, Lu*). Skagway (*E. Nander in 1913, St*). Sitka (*Eastwood 958, G*). Unalaska (*Hultén 7532b, Lu, MW*). Akutan (*Norberg, Lu*).

**NEW HAMPSHIRE:** Connecticut Lake (*Sturns, Wa*).

**MASSACHUSETTS:** Shade, border of woods, Mt. Washington, Berkshire Co. (*Meredith, St*). Swampscott (*Harper, P*).

**NEW YORK:** Penn Yan, Yates Co. (*Wright, Le*). Northville, Long Island (*H. W. Young, Wa*).

**NEW JERSEY:** South Amboy (*Kelsey 188, La*).

**PENNSYLVANIA:** Lancaster (*Heller, De*). Upper Susquehanna, Sayre (*Barber, Be*). Hyndman, Bedford Co. (*Small, Ch*). Paradise Falls, 270 meters (*Bernhardt, P*).

**DISTRICT OF COLUMBIA:** Potomac Flats (*A. Ruth, NY*).

**MARYLAND:** Open fields near Clinton (*T. Holm, Br*). Washington (*E. S. Steele, De, UW*).

**VIRGINIA:** Bedford Co. (*Curtiss, St*). White Top Mt. (*Rydberg 8122, NY*). Vicinity of Chain Bridge (*Van Eseltine & Mosely 22, 34, Wa*).

**GEORGIA:** Athens (*R. M. Harper, UW*).

**FLORIDA:** Waste ground, Tallahassee, Leon Co. (*Moldenke 1173, St*).

**OHIO:** Hamilton Co. (*Matthes, Be*). Jamestown (*Wooton, Wa*). Cincinnati (*Lloyd, P*).

**TENNESSEE:** In paludosis ad French Broad River pr. Dandridge (*Rugel, Be*).

**ILLINOIS:** (*Eggert, Le*).

**MISSOURI:** (*Engelmann, Be*). St. Louis (*Geyer, MW*). Vacant grounds, Missouri Bot. Gard. (*?, Lu, UW*). Butler Co. (*H. H. Smith 599, Ch*).

**IOWA:** Decatur Co. (*Fitzpatrick, La*).

**LOUISIANA:** New Orleans (*B. Matthes, Lu, Be*).

**KANSAS:** Cherokee Co. (*A. S. Hitchcock, UW*).

**OKLAHOMA:** Pottawatomie Co. (*P. I. White, Lu*).

**COLORADO:** Fort Collins (*I. H. Cowen, Be, Lu, Up; 3832, P*).
NORTH AMERICAN SPECIES OF RUMEX

NEW MEXICO: Kingston, Sierra Co., 1,980 meters (O. B. Metcalfe, Be, De).

UTAH: Farmington Canyon, near Salt Lake City, 1,290–1,650 meters, low woods near springs, common (Pammel & Blackwood 3639, Z).

ARIZONA: Chiricahua Mts., Barfoot Park, 2,400 meters (J. C. Blumer, Be).


MEXICO: Veracruz, Jalapa, 1,400 meters (R. Endlich, Be). Federal District, Valley of Mexico (Pringle 7488, G). Morelos, Cuernavaca, Montes Las Tres Marías, 3,000–3,200 meters (Fröderstrom & Hultén 231, St).

JAMAICA: Hardware Gap, 1,200 meters (Harris 10113, Wa).

42. Rumex pulcher L.

Lower leaves small, cordate at base, somewhat crisp marginally, often pubescent beneath; branches of the panicle very divergent, often intricate in fruit; flower verticils partly with leaves, all remote; pedicels thick, not longer than the fruit, jointed in the middle; valves toothed 4.5–6 mm. long, 2.5–4.5 mm. wide, usually all bearing a grain, but grains often of unequal size; nutlets 3–4 mm. long, broadest a little below the middle.

Indigenous in the Mediterranean Basin. Introduced to North and South America, South Africa, etc. The species is very polymorphic and is represented in the Old World by five subspecies. The American specimens belong to the following three: subsp. eu-pulcher Rech. f. (see op. cit. 1: 26), characterized by leaves usually contracted above the base (panduriform), by valves obviously longer than broad, with relatively long teeth; subsp. divaricatus (L.) Murb. (R. brevipes Meisn. apud DC. 55. 1856; see Rech. f. op. cit. 1: 35),
characterized by leaves usually not contracted and valves about as long as broad, with short teeth; subsp. *anodontus* (Hausskn.) Rech. f. (see op. cit. 1: 34), characterized by leaves usually not contracted and valves without teeth (or nearly so).

**SYNONYMY:** L. Sp. Pl. 336. 1753; Campderea 82. 1819; Meisn. apud DC. 58. 1856; Wats. 9. 1880; Trelease 91. 1892; Brittt. & Brown 552. 1896; Small 371. 1903; Gray 357. 1908; Jepson 293. 1923; Rech. f. Vorarb. Monogr. Rumex 1: 25. 1932; Vorarb. 2: 46. 1933.

**Subsp. eu-pulcher** Rech. f.

**VIRGINIA:** Norfolk (Ward, Wa; no fr.; Britton, Ch). Virginia Beach (*Sudworth*, Wa). Williamsburg (*Grimes* 2692, NY; no fr.).

**LOUISIANA:** New Orleans (*Drummond*).

**TEXAS:** Columbia, Brazos River (*Bush* 208, NY; no fr.).

**OREGON:** Pasture, Port Orford (*Peck* 8467, NY; no fr.). Albina, Portland (*Suksdorff* 755, P).


**MEXICO:** Valley of Mexico, 2,190 meters (*Pringle* 8518, Ca, St).

**Subsp. divaricatus** (L.) Murb.

**FLORIDA:** Moist, grassy field, Tallahassee, Leon Co. (*Moldenke* 1117, SL, St; no fr.). Tallahassee (*Harper*, Wa; no fr.).

**LOUISIANA:** New Orleans (*Drummond*, MW).

**TEXAS:** Sandy, open ground, Bryan, Brazos Co. (*E. J. Palmer* 11745, Ca, La, Br, MW). Low, sandy ground near bay, Morgans Point, Harris Co. (*Palmer* 11967, Ca, La, Br). Port Arthur, beach (*Kolthoff*, St). West of Troup (*Reverchon*, SL; no fr.). San Antonio (*Schulz* 2295, Ch).

of California, Arizona, etc.” (Palmer, Be, MW). Foothill region, Blue Oak and Digger Pine Belt, Copperopolis, Calaveras Co., 300 meters (Tracy 5598, Ca).

MEXICO: San Angel (Schiede, Be). Vallée de Mexico (Bourgeau, Ke; no fr.). Mineral del Monte ( Ehrenberg, Be; type of R. brevipes Meisn.). Hidalgo, wet places near Tula, 2,040 meters ( Pringle 13180, Wa, Ke, Be, Ko, By). Mt. Orizaba ( Seaton 365, Ch, G). Chinantla ( Liebm ann 699, F, Ko). Tiuzutlán ( Liebm ann 699, F, Ko).

BERMUDA: Harrington House ( Brown, Ko).

Subsp. anodontus (Hausskn.) Rech. f.


CALIFORNIA: Stockton, San Joaquin Co. ( B. Davy 1195, Ca).

44. Rumex violascens Rech. f. Figure 23

Planta annua vel biennis (vel interdum perennans). Caulis validus rarius gracilis ad 80 cm. altus in parte inferiore stricte erectus in parte superiore ± flexuosus tota longitudine canaliculatus, saepe purpureo-suffusus, a medio (rarius iam infra) ramosus et florifer. Rami plerumque breves, arcuato-divergentes, a caule angulo ca. 45°-60° abuntes, paniculam parvam apertam formantes. Ochreae albidae vel bruneae hyalinae. Folia omnia in vivo ut videtur subcarnosa in sicco crasse membranacea vel subcoriacea, plana vel margine crispula, glaberrima, ut tota planta levia. Nervi laterales foliorum a mediano angulo 45°-60° abuntes. Folia basalia obverse lanceolata vel elongato-obovata, latitudine 2-4-plo longiora, supra medium plerumque latissima, supra basin saepe paulo panduriformi-constricta, basi late cuneata vel truncata, apice obtusa vel acutiuscula. Petiolus crassiusculus ad summum dimidiam longitudinem laminae aequans. Folia caulina inferiora et media basalis similia sed minora et proportione angustiora et longiora et brevior petiolata. Folia summa parva anguste lanceolata utrinque angustata
breviter petiolata. Florum glomeruli plurimi remoti summi tantum in statu fructifero contigui, infimi tantum folio suffulti. Perigoniorum fructiferorum pedicelli validiusculi valvis aequilongi vel saepius 1.5 (-2) -plo longiores, prope basin incrassato-articulati, ab articulatione basin perigonii versus paulo dilatati ibique subinflato-incrassati. Perigonii foliola exteriora anguste lanceolata acuta, vix 1 mm. longa, basibus interiorum appressa. Perigonii folia (valvae) in statu fructifero 2.5-3 mm. longa, 2-3 mm. lata, ambitu deltoidea vel triangulari-lingulata, apice acuta, margine basin versus utrinque irregulariter acute pluridentata, rarius subintegra. Valvae facie scrobiculato-nervosae, reticulo nervaturae valde prominente irregulari apicem versus saepe evanescente. Valvae omnes calli-ferae; calli inaequales, maior 1.5-2 mm. longus, ± 0.75 mm. latus, ovatus, prominens, apice acute in nervum medianum valvae transiens, sub lente minute impressa punctulatus, interdum insuper transverse rugulosus. Nux brunea, 1.7 mm. longa, ± 1.2 mm. lata, vix infra medium latissima.


ILLUSTRATION: Trelease 1892, pl. 27 (only the fruiting branch and the left-hand leaf, as R. Berlandieri).

DISTRIBUTION: Western United States from California to Texas, and in Mexico; in low land, often on ditch banks.


ARIZONA: Tucson (Tourney 342, 343a, Wa, Ca; Evans, SL). Phoenix (Tourney 343b, Wa; Dewey, Wa). Colorado Valley (Palmer 638, Wa, SL, Ch; no fr.). Catalpa (McDougal 751, Wa).

Fig. 23. Rumex violascens Rech. f.
MEXICO: San Lorenzo de Laguna and vicinity; 22–27 leagues southwest of Parras, Coahuila (Palmer 1182, Wa, UW, Paris; no fr.). Hermosillo, bed of Río de Sonora (Maltby 203, Wa; Rose, Standley & Russell 12463, Wa; dwarf specimen).

CULTIVATED: California, Berkeley (? , Ca).

INTRODUCED: Denmark: Amager, Paa Falleden (Wiinstedt, Ko).

This species has been identified by most American authors with R. Berlandieri Meisn. I consulted Meisner’s type in the Berlin Herbarium, and pointed out that R. Berlandieri is not identical with the plant described here, but belongs to the subsection Salicifolii. R. violascens, on the contrary, is next related to R. paraguayensis Parodi; see Rech. f. Vorarb. 3: 33. As to the differences between R. Berlandieri and R. violascens, see the remarks under R. Berlandieri. The variability of R. violascens with regard to shape and breadth of leaves and outline and degree of denticulation of the valves is important, but since several characters never occur together, there is no reason to distinguish varieties.

Explanation of Figure 23.—Rumex violascens Rech. f., half natural size: (a) habit, Mexico, Parry 1173; (b) basal leaf, Arizona, MacDougal 751. Valves 4 times natural size, Arizona, Dewey.

45. Rumex flexicaulis Rech. f. Figure 24

interiorum appressa. Perigonii folia interiora (valvae) in statu maturo 3–3.5 mm. longa, 2.2–2.9 mm. lata, consistentia coriaceo-membranacea, colore atrobruneo-rufescenti, ambitu triangula ria, basi truncata, apice in linguam acutiusculam protracta, margine basin versus utrinque 2–3 (–4) -dentata. Dentes parvi acuti irregular es 0.5 mm. (raro ad 1 mm.) longi. Valvae facie distincte reticulato-nervosae omnes subaequaliter calliferae; calli 1.2–1.6 mm. longi, 0.3–0.4 mm. lati, valde prominentes, anguste fusiformes, apice sensim in nervum medianum transientes, facie minute impresse cellulato-punctati. Nux matura brunea ± 2 mm. longa, ± 1 mm. lata, infra medium latissima, basi subbrevius, apice longius acuminata.


MEXICO: Valley of Mexico, 2,190 meters (Pringle 9612, Wa). Bord des fossées près Mexico (Bourgeau 200, Ke). Chapultepec, auf feuchten Feldern (Schaffner, Ke). Without locality (Schmitz, MW; no fr.). Mexico City (Orcutt, 4073, Ch).

Specimens of this species have been distributed under the name _R. maritimus_ L. _R. flexicaulis_ is very distinct from the American and all the other representatives of the _Maritimi_ by its broad leaves, large fruiting perigonium with short teeth, and large nutlets.

Explanation of Figure 24.—_Rumex flexicaulis_ Rech. f.; half natural size; Mexico, Schmitz. Valves 4 times natural size; Mexico, _Bourgeau_ 200.

46. _Rumex fueginus_ Philippi. Figure 22, c–g

Annuus vel interdum biennis (aut perennans?). Caulis erectus vel adscendens, 15–60 cm. altus, strictus vel angulato-flexuosus, gracilis vel validus, subfistulosus brunnescens interdum purpurascens, ± tenuiter sulcato-striatus, papilloso-scaber glabrescens vel glaber, a medio vel a basi ramos fructiferos emittens. Rami angulo ca. 45° arcuato-ascendentes vel erecti, inferiores saepe elongati et iterum ramosi superiores ± abbreviati simplices. Ochreae albido-bruneae cito evanescentes. Folia omnia in sicco tenuiter vel crasse membranacea vel subcoriacea, nervis secundariis angulo ca. 60° a primario abentibus, margine ± undulato-crispa, glabra vel saepius—imprimis subtus ad nervos—pubescenti-scabra. Folia basalia linearilanceolata, basi leviter cordata vel truncata, supra basin saepe dilatata vel paulum panduriformi-constricta, apice acutiuscula, latitudine 5–7-plo longiora, petiolata; petiolus lamina brevior. Folia caulina media basalibus similia sed brevius petiolata, petiolus
latitudinem laminae ± aequans. Folia caulina superiora angustissime linearia subplana basi cuneata. Panicula fructifera ampla aperta in speciminibus macris interdum compacta. Florum glomeruli multiflori infimi tantum remoti superiores contigui, in statu fructifero saepe valde compacti, omnes folio suffulti. Perigoniorum fructiferorum pedicelli tenuissime setacei, prope basin tenuiter annulato-articulati, basin perigonii versus sensim paulum dilatati, perigonio maturo 1–2-plo longiores. Perigonii foliola exteriora anguste lanceolato-linearia, ca. 1 mm. longa, basibus interiorum appressa, apice acuta, saepe aliquantum recurva. Perigonii folia interiora (valvae) 1.7–2 mm. longa (apice inclusu), 0.7–0.9 mm. lata (dentibus exceptis), subcoriaceo-membranacea, apice in linguam angustissimam acutam superantes fissa, facies angusta tota fere callo occupata nervatura itaque vix conspicua in dentes apicemque excurrens. Valvae omnes subaequaliter calliferae, calli ca. 1 mm. longi latitudine ca. 3-plo longiores valore prominentes apice obtusiusculi, facie tenuissime cellulato-punctati. Nux matura brunea, 1.3–1.4 mm. longa, 0.5–0.7 mm. lata, utrinque subaequaliter acuminata in medio circiter latissima.


ILLUSTRATIONS: Rhodora 17: pl. 113. 1915 (R. maritimus var. fueginus); Trelease 1892, pl. 32 (as R. persicarioides); Britt. & Brown 552. 1896 (bad; as R. persicarioides).

DISTRIBUTION: Southern parts of South America and Andes of Ecuador; Canada; United States (southeastern states excepted).—Imperfectly developed Canadian specimens collected by Marie-Victorin and Rolland-Germain could, because the shape of the leaves is the same in both species, belong as well to R. persicarioides L.

PRINCE EDWARD ISLAND: Queen’s Co., border of salt marsh, Bunbury (Fernald, Long & St. John 7340, Wa).
NOVA SCOTIA: Lagoon, Sable Island (Macoun 22594, Ch).


ALBERTA: Damp earth, ditch side, Craigmyle (Brinkman 786, Ch; 787, Wa). Border of marsh, north side of Bow River, Calgary (Moodie, Ch, Wa). Bow River, 1,350 meters, Actin Village (Setchell & Parks, Ca; dwarf specimen). Silver City (Macoun 23742, Ch). Banff (McCalla 2399, Wa).

SASKATCHEWAN: Prince Albert, Lat. 58° (Macoun 12914, Ch).

BRITISH COLUMBIA: Vancouver Island, Alberni Canal (Macoun, Wa). Nanaimo (Macoun 83930, Ch; approaching var. tanythrix).

RHODE ISLAND: Shores of Watch Hill Pond, Watch Hill (Setchell, Ca; approaching var. tanythrix).

WISCONSIN: Dry marsh, Delavan (Hollister 143, Wa). Silver Lake, Elkhorn, Walworth Co. (Hotchkiss & Martin 4399, UW; dwarf specimen).

ILLINOIS: Chicago, Stony Island (Greenman 2805, Wa; approaching var. tanythrix).


IOWA: Mud Lake (Hitchcock, Ca). Iowa Lakeside Laboratory, Lake Okoboji, Dickinson Co., along canal (Conard, MW).


ARKANSAS: Little Rock, sandy flood plain of Arkansas River west of Iron Mt. R. R. bridge (Coville 66, Wa).
NORTH DAKOTA: Mud Lake, Hankinson (Metcalfe 146, Wa). Leeds, Benson Co. (Lunell, Ch, Wa; partly tanythrix). Dickson (Holgate, Wa; approaching var. tanythrix). Lake Velva (Mabbott 444, Wa; tanythrix).

SOUTH DAKOTA: Iroquois (Thornber, Ca). Sandy beach of Missouri River near White River (Geyer 137, Wa). Cheyenne River (?).


MONTANA: Vicinity of Bozeman, wet ground (Blankinship 453, St, Wa). Harlowton (Wooton, Wa). Townsend (Shear 5238, Wa). Mountains south of Virginia City (Allen ?, Wa; brachythrix). Dried-up pool, Glacier Park Station, 1,440–1,530 meters (Standley 17663, Wa). Without locality (Anderson, Wa; tanythrix).


NEW MEXICO: Mangas Springs (Wooton, Ca; Metcalfe, Wa; brachythrix). Along ditches, Navajo Indian Reservation, Shiprock Agency, 1,425 meters (Standley 7262, Wa). Marsh, Jicarilla Apache Reservation near Dulce, 2,150–2,470 meters (Standley 8159, Wa). Gila (Wooton, Wa). Along ditch, Farmington, San Juan Co., 1,550–1,650 meters (Standley 6879, Wa; brachythrix). Mountains southeast of Patterson (Wooton, Wa; approaching brachythrix).


IDAHO: St. Anthony (Merrill 482, Wa). Wet soil along irrigating ditch, St. Anthony (Merrill & Wilcox 1185, Wa; brachythrix). Falk's Store, Canyon Co. (Macbride 310, Wa, P, Ca). Granite Station, Kootenai Co. (Sandberg, etc. 778, Wa). Coeur d'Alene Mts., low meadows, Blue Creek, 750 meters (Leiberg 1326, Ca, Wa). Fernan Lake shore, Coeur d'Alene Mts. (J. Rust, Wa). Shores of Lake Pend d'Oreille (?; 559, Ca).


UTAH: Vermillion, 1,620 meters (Jones 5839, Wa, Ca; athrix). Salt Lake City, 1,290 meters (Jones 1064, MW, Wa; brachythrix). Salt Lake Valley, 1,350 meters (Watson 1053, Wa; approaching
brachythrix).  Rabbit Valley, 2,010 meters (Ward 598, Wa; partly athrix).  Panguitch Lake, 2,520 meters (Jones 6015ax, 6002an).

ARIZONA: Road between Springerville and Fort Apache, Apache Co., 2,120-2,800 meters (Eggleston 15755, Wa; brachythrix).


ECUADOR: In solo salso prope Salinas, Prov. Ibarra (Sodiro, Bu).

St. John has treated carefully the North American representatives of the Maritimi in Rhodora 17: 73. 1915.  He comes to the following conclusions:

(1) The name R. persicarioides L. is very probably not to be applied to the most common North American plant as was done by Trelease and subsequent authors, but to a type limited to salt marshes and saline shores along the lower St. Lawrence and Richelieu rivers, characterized by the swollen, elliptic-ovate, straw-colored grains, not narrowed into the midrib of the valve.
(2) The most common North American type, with usually somewhat curled leaves, truncate or slightly truncate at the base, mostly named R. persicarioioides since Trelease, is identical with the South American R. fueginus Philippi. As there are no remarkable differences in leaves and fruits between this plant and the Eurasian R. maritimus L., St. John calls the common American plant R. maritimus var. fueginus, as Dusén did.

(3) In the drier parts of the western United States occurs a form of R. fueginus differing from the type by the reduction or the complete lack of teeth on the margin of the valves. St. John calls this type R. maritimus var. athrix.

(4) The Eurasian R. maritimus with plane (not curled) leaves, cuneate at the base, has been found twice in the United States as an introduction.

(5) R. crispatulus Michx., by Trelease taken as a synonym of his R. persicarioioides, is R. obtusifolius L. according to Fernald, who examined the type specimens (Fernald apud St. John, op. cit. 77).

The Gray Herbarium kindly lent me some specimens named by St. John as R. persicarioioides, which I have compared with more than 150 sheets of R. fueginus from all parts of North America, and I can confirm his conclusions. In the reddish-brown color of the whole plant, especially of the fruiting perigonia, R. persicarioioides agrees completely with R. fueginus. The length of the teeth of the valves is variable in both species, but in R. fueginus much more so than in R. persicarioioides. This character, therefore, can not be considered diagnostic, as St. John believed, so the grain character remains the only distinction, since I could not find any differences in the vegetative parts. Nevertheless, I consider that this single character together with the geographic distribution is sufficient to maintain the two types as species.

I also agree with St. John in stating that the common North American type is identical with the South American. Slight differences in the length of the inner perigonum segments—those of the South American plants are usually somewhat longer—may be neglected. The occurrence of R. fueginus in Ecuador, recently pointed out by me (see note on page 137), suggests a link between the two remote parts of the area of R. fueginus. More localities for R. fueginus may still be found in the Andes.

I can not agree with St. John’s taxonomic concept of R. fueginus as a variety of R. maritimus. The differences between R. maritimus
and *R. fueginus* in the papillosity and shape of the leaves, and in the color of the ripe fruiting perigonia, together with the existing but not tangible differences in the outline of the valves and with the geographical distribution, make a specific distinction necessary between *R. maritimus* and *R. fueginus*. There can be no doubt that *R. fueginus* is much more nearly related to *R. persicarioides* than to *R. maritimus*.

The variability of *R. fueginus*, in regard to habit, shape and texture of leaves, size of valves, and length of teeth, is considerable in both parts of the area, but greater in the northern one. In swamps the lower parts of the stem are often somewhat swollen or the stem is procumbent or ascending. Dwarf forms seem to occur on humid sand. In shady situations the whole plant becomes weak and tender. Some of the South American specimens show strongly curled leaves and more distinct papillosity of the vegetative parts. But no combinations of characters are fixed or limited to certain regions, so that the following varieties, very striking in extreme cases but connected by transitional forms, have but little taxonomic significance, except perhaps var. *athrix*.


Var. *brachythrix* Rech. f.—Valvarum dentes latitudinem valvae vix superantes; valvae et nuces saepe minores quam in typo.

Var. *typicus* Rech. f.—Valvarum dentes latitudinem valvae circiter 1.5–2.5-plo superantes.

Var. *tanythrix* Rech. f.—Valvarum dentes latitudinem valvae 3–4-plo superantes.

To the above it seems necessary to add a peculiar-looking plant, which I designate at present as var. *ovato-cordatus* Rech. f.: Differt a typo foliis caulinis inferioribus e basi leviter cordata late ovatis acutis, nervis secundariis angulo 70°–80° a primario abeuntibus, latitudine vix 1–1.5-plo longioribus. I saw only one sheet: California, Oxnard, Ventura Co. (B. Davy 7804). In the list of specimens examined the names of the varieties are added.

Explanation of Figure 22, c–g.—Valves 4 times natural size: (c) *Rumex fueginus* var. *athrix* (St. John) Rech. f., from Jones 5839; (d) var. *brachythrix* Rech. f., Butler 1877; (e) var. *ovato-cordatus* Rech. f., Davy 7804 (a basal leaf added); (f) var. *tanythrix*
Planta annua. Caulis erectus, 10-50 cm. altus, strictus vel anguloso-flexuosus, gracilescens, fistulosus, tenuiter sulcato-striatus minute pubescenti-seaber, rufo-bruneus, a medio vel iam infra ramosus et fructifer. Rami fructiferi angulo ± 45° a caule abeuntes arcuato-divergentes, singuli, inferiores ± elongati iterum ramosi, superiores breves simplices. Ochreae parvae membranaceae cito evanescentes. Folia basalia e basi truncata vel subcordata lineari- vel oblongo-lanceolata. Folia caulina inferiora basi late cuneata vel truncata vel interdum subcordata basalis similia, consistencia in sicco ± tenuiter membranacea, margine ± crispato-undata, apice acuta, latitudine 5-7-plo longiora, nervis secundariis angulo 45°-60° a mediano abeuntibus, imprimis subtus tenuiter pubescenti-scabra, petiolata. Petiolus latitudinem folii aequans vel interdum superans. Panicula fructifera ampla aperta. Florum glomeruli multiflori infimi remoti, superiores valde approximati in statu fructifero contigui, omnes folio suffulti sed folia apicem ramorum versus valde diminuta et vix prominentia. Perigoniorum fructiferorum pedicelli tenuiter filiformes, prope basin annulato-articulati, basin perigonii versus sensim paulum dilatati, perigonio maturo 1.5-plo longiores. Perigonii foliola exteriora anguste lanceolato-linearia, 1 mm. longa, basibus interiorum appressa, apice acuta. Perigonii folia interiora (valvae) in statu maturo apice inclusu 2 mm. longa, dentibus exceptis ca. 1 mm. lata, consistencia subcoriaceo-membranacea, colore intense fusco-brunea, ambitu anguste lingulato-triangularia, basi non dilatata, apice in linguam angustissimam acutam excurrentes, margine utrinque in dentes duo subulato-setaceos tenuissimos elongatos latitudine valvae ca. 2-plo longiores paulum divorcatis fissa, facie reticulato-nervosa, nervis in dentes apicemque excurrentibus. Valvae omnes subaequaliter calliferae, calli ca. 1 mm. longi, prominentes, latitudine ca. 2-3-plo longiores, basi apiceque rotundata, facie tenuissime colluratopunctatii, valvae faciem omnino fere occupantes, colore in sicco aurantiaco. Nux matura brunea ca. 1.1 mm. longa, 0.5-0.6 mm. lata, basi brevius, apice longius acuminata, infra medium latissima.


FIG. 25. Rumex persicarioiides L.
DISTRIBUTION: Eastern Canada, Massachusetts, Oregon, California.

PRINCE EDWARD ISLAND: Prince Co., edge of brackish pond, Malpeque (Fernald & St. John 11038, G). Queens Co., border of salt marsh, Bunbury (Fernald, Long & St. John 7388, G).

NEW BRUNSWICK: Gloucester Co., wet sand behind beach, Miscou Harbor, Miscou Island (Blake 5577, Wa; no fr.).


MASSACHUSETTS: Sandy shore and flats at north end of Tashomoo Lake, Tisbury (Seymour 1180, Wa, NY; 1462, Ca). Sandy margin, Poncha Pond, Edgartown (Brooks, Ca). Gloucester, sandy cove, Bay View (E. F. Williams, G).

OREGON: Newport, on sand on beach (Spillman 162, P). Beach, Seal Rock, Lincoln Co. (Peck 10591, Ch).


See St. John, loc. cit., for further citations of material.

*Rumex persicarioides* entirely agrees in vegetative parts with *R. fuegimis*, so that flowering specimens from regions where both species are expected to occur can not be named. *R. persicarioides* differs from *R. fuegimis* by somewhat narrower valves, rather elliptic (not triangular) in outline, and by thick, swollen grains, obtuse and not narrowed into the midrib. The grain is so large that only a narrow margin of the valve is visible.

Generally *R. persicarioides* is limited to the New England States and southeastern Canada, but St. John told me that he saw in the herbarium of Willamette University, Salem, Oregon, a specimen from Oregon belonging to this species, and I found one from California (Walker 1539) that shows the characters of *R. persicarioides* so clearly that I must take it for this species. It is distinguished from the eastern American specimens only by the valves and grains being somewhat larger and the teeth of the valves relatively shorter.

*R. persicarioides* differs from the Eurasian *R. maritimus*, which occurs in the United States very rarely introduced, by the papillose
pubescence of the stems and under side of leaves, by the (at least in
dried state) reddish-brown color of the fruiting panicle, by the leaves
being shortly contracted and truncate or subcordate at the base,
frequently crisped at the margin, and by the large, swollen, rounded
callosities occupying the larger part of the valves.

Explanation of Figure 25.—Rumex persicarioides L., half natural
size; Massachusetts, Seymour 1180. Valves 4 times natural size:
(a) Massachusetts, Seymour 1180; (b) California, Walker 1539.

48. Rumex maritimus L.

Very similar to the American R. fueginus Philippi, but differing
from that by the complete lack of papillosity, the leaves flat and
narrowed at the base, by the golden (never reddish-brown) color of
the fruiting panicle, and by the shape of the valves.


Indigenous in Europe and Asia, very seldom introduced to
America. I saw only the following specimen:

NEW JERSEY: Hoboken, ballast filling (A. Brown, Wa).

49. Rumex bucephalophorus L.

Annual or biennial; stem low, usually with some spreading
branches, glabrous; leaves small, ovate or lanceolate, cuneate at the
base, acutish; pedicels to twice as long as the fruit, finally much
thickened toward the base of the perianth and nearly clavate;
valves to 2 mm. long, about 1 mm. broad, each of them with a
minute callosity and 2–3 teeth on each side.

SYNONYMY: L. Sp. Pl. 336. 1753; Trelease 95. 1892; Small 96. 1903.

Originally from the Mediterranean basin, where it is conspicu-
ously variable. In America found only once as introduced:

LOUISIANA: On ballast ground, Port Eads (A. B. Langlois 95).

HYBRIDS

1. Rumex Britannica L. × crispus L.

R. dissimilis Rech. f.

Differt a R. Britannica: Fructibus inaequaliter evolutis ma-
ioribus et minoribus mixtis, partim longissime partim brevius pedi-
cellatis, callis inaequalibus partim ovatis, partim elongato-fusiformi-
bus, foliis basalibus minoribus angustioribus subcrispatis.—Differt a
R. crispo: Fructibus inaequaliter evolutis, valvis partim maioribus
margine denticulatis, callis multo longioribus, maculis nervaturae marginalibus partim valde elongatis, folio basali latiore subplano, nervis secundariis angulo fere recto a primario abeuntibus.


 MASSACHUSETTS: Plymouth, in a wet meadow (? , Up).

I have seen only the upper part of a fruiting specimen and one basal leaf. The panicle, because of the unequal size of the fruits and the unequal development of the grains, gives at once the impression of a hybrid. Most of the nutlets are compressible and may never have been viable. By the long pedicels, the orbicular valves, and the grains being at least in part extremely elongate, as well as by the lateral nerves of leaves forming nearly a right angle with the midrib, this plant resembles R. Britannica. The other parent species can only be considered a plant with not much shorter pedicels, valves all bearing grains, and shorter, narrower, crisped leaves. These characters are united in none of the indigenous North American species, but are found in R. crispus. This plant deserves special attention, as the only wild hybrid of an indigenous North American species.

2. Rumex crispus × obtusifolius

Differing from R. crispus by its broader leaves, somewhat cordate at the base, narrower valves with short teeth, and usually more slender habit, and from R. obtusifolius by the more or less crisped, narrower leaves and broader valves with shorter teeth. This hybrid is rather common in Europe and occurs also frequently wherever the parents grow together as naturalized. Pollen and fruits are usually sterile in large part. R. obtusifolius being represented as adventive mostly by the subsp. agrestis, the American specimens of the hybrid mentioned below belong to the combination R. crispus obtusifolius subsp. agrestis.


NEWFOUNDLAND: Region of Humber Arm, Bay of Islands, Birchy Cove (Fernald & Wiegand 3293, NY).

 PENNSYLVANIA: (Rothrock, Ch).


 OHIO: Mansfield (Wilkinson, Wa, Lu).
NORTH AMERICAN SPECIES OF RUMEX 149

WISCONSIN: Oneida Res., Brown Co. (Schuette, Ch).
LOUISIANA: New Orleans (Drummond 282).
OREGON: Sauvies Island (Howell, Wa).
TEXAS: Huntsville, Walker Co. (Palmer 12034, Ca, SL, Br).
HAITI: Massif de la Hotte, eastern group, Pt. Goave, Cap St. Michel, 1,000 meters (Ekman, Wa).

3. Rumex crispus × pulcher (see Rech. f. Vorarb. 1: 82)
VIRGINIA: Near Ocean View Station (Coville 3, Ke).

4. Rumex dumosus × triangulivalvis
I take from Danser’s extensive descriptions the following remarks: “R. adscendens differt a R. dumosus habitu molto minus insolito, foliis subviridibus basi non dilatatis minusque crispis, ramorum evoluzione finita, flororum glomerulis partim efoliatis.—Originem e R. salicifolio indicant caules parte inferiore levi, folia lanceolata sublevia, absentia foliorum radicaliorum, pedicelli breves paulum incrassati, conspicue articulati et valvae triangulares membranaceae.”
This hybrid grew in the Amsterdam Botanical Garden from seeds of R. dumosus which was cultivated in the neighborhood of R. triangulivalvis.

5. Rumex paraguayensis × triangulivalvis
I take from Danser’s extensive description the following remarks: “Haec hybrida parentibus intermedia est et neutri parentis similis est. Habitus, folia radicalis obovata, foliorum margines crisi et racemi maxima pro parte foliati a R. paraguayensi veniunt. Folia autem angustiora acuta et, margine crispa excepto, levissima, racemi apice aphylli, valvae maiores, integrae vel fere integrae et color racemorum albidus sunt notae quas a R. salicifolio hereditate accepit hybrida.”

Danser obtained this hybrid from seeds of *R. paraguayensis*, which was cultivated in the Amsterdam Botanical Garden in the neighborhood of *R. triangulivalvis*.

**AMERICAN SPECIES OF RUMEX NOT IDENTIFIED**

*Rumex americanus* Campd. 151. 1819.
*Rumex Claytoni* Campd. 66, 99. 1819. Perhaps a synonym of *R. Britannica* L.
*Rumex heterophyllus* Raf. New Fl. N. Amer. 4: 52. 1836.
*Rumex integrifolius* Raf. loc. cit.
*Rumex polygamus* Sessé & Moc. Fl. Mex. 97. 1887.
TITLES OF LITERATURE CITED


Campdena, F.: Monographie des Rumex, etc. Paris, 1819.


Rechinger, K. H.: Vorarbeiten zu einer Monographie der Gattung Rumex:
II. In Fedde, Repertorium specierum novarum, Bd. 31. Berlin, 1933.


