IDENTIFICATION OF POLYGONACEOUS WEEDS IN NEW ZEALAND

A. J. HEALY

Botany Division, D.S.I.R., Christchurch

Summary

A key is given for the identification of thirty-four (34) weedy species of the Polygonaceae, representing the genera *Emex* (1 sp.), *Fagopyrum* (1 sp.), *Muehlenbeckia* (4 spp.), *Polygonum* (15 spp.), and *Rumex* (13 spp.). Vegetative, floral and fruiting characters are discussed and their significance in identification indicated. *Polygonum baldschuanicum* Regel and *Rumex frutescens* Thouars are recorded as adventive in New Zealand for the first time.

INTRODUCTION

THE WEEDY PLANTS treated belong to the family Polygonaceae, which includes, in addition to a range of weeds in overseas countries, such useful plants as buckwheats (*Fagopyrum*), rhubarb (*Rheum*) and a number of garden ornamentals.

The term "weedy" has been interpreted in a broad sense, and consequently the paper includes some species which are widespread troublesome weeds and others less troublesome or less widely distributed; several that have been reported as occasional to not uncommon in the past but which the writer has not seen are included, as also are some garden escapes and casuals. Four native species of *Muehlenbeckia* (pohuehue) are included; *M. australis*, because of its smothering habit in native bush remnants, native bush reserves and over planted trees, *M. complexa*, because it establishes in and over gorse hedges, etc., and *M. axillaris* and *M. ephedroides* because of their weedy habit and occurrence with a range of weeds on dry, river terrace country, etc.

A key is given for differentiation, and while vegetative characters (leaf shape, underground parts, etc.) have been used for some separations, their diagnostic use is limited, and certain identification of some species is possible only by use of flower head, fruiting head and fruit characters. While most features are visible to the naked eye, others (e.g., hairs of leaf sheaths, nature of fruits and fruit coverings) are best examined using a low-powered hand lens or magnifying glass.

Because of the similarity in general appearance of species within the major groups, i.e., docks (*Rumex*) and willow weeds (*Polygonum*), it becomes necessary, in some instances, to resort to not-so-simple characters to make accurate identifications, and difficulties will be encountered. This statement is made advisedly, and based on personal experience, not to dishearten prematurely, but to indicate that identifications of these weeds might not always be easy.

CHARACTERS IMPORTANT IN IDENTIFICATION

1. UNDERGROUND PARTS

The nature of the subterranean organs is useful in differentiating groups of species, and this should be determined as a matter of course in examining plants in the field. A tap-root may be present — slender, e.g., *Polygonum convolvulus* (black bindweed), or long and stout with distinct crown, e.g., *Rumex* spp. (docks). Rhizomes

(underground creeping stems) are found in colony- or patch-forming species in three genera, e.g., *Muehlenbeckia axillaris*, *Polygonum sachalinense* (sacaline), *Rumex acetosella* (sheep's sorrel), and may be slender or to 1 in. or so in thickness.

2. STEMS

Whether or not stems are twining (climbing) is readily discernible in the field and enables initial disposition of a given plant into one of two groups of species; whether or not stems are woody is often difficult to decide, since several species may be stout and woody in the lower portions but herbaceous above, e.g., *Polygonum sachalinense*; allowance is made for this by including the species concerned in both the woody and herbaceous sections of the key. Height of the plant and length of stems is often variable within a species, from a few inches to several feet. The surface may be smooth, angled or finely ridged longitudinally (striate), e.g., *Muehlenbeckia ephedroides*, or hairless, or with spreading hairs, or with appressed (lying along the surface) hairs with or without raised bases; glands may be absent over the whole length, or present, especially in the upper portion which bears the flower heads, e.g., *Polygonum lapathifolium* (pale persicaria). The nodes (joints, knots) are little raised in some species, e.g., *Rumex* spp., but may be conspicuously swollen and often rooting in some species of *Polygonum*, especially when the lower portion of the stem is prostrate on damp soil.

3. LEAF SHEATHS (OCHREAE)

These tubular structures sheathing the stems at the nodes are characteristic of the family Polygonaceae; they may be long or short, few- or many-nerved longitudinally, entire or torn at the upper margin, hairless or with spreading or appressed hairs on the external surface, glandular or glandless, closely sheathing or spreading, the upper margin with, e.g., *Polygonum persicaria* (willow weed), or $\pm$ without, e.g., *Polygonum lapathifolium* (pale persicaria), a fringe of long hairs. These sheaths may be colourless, greenish, brownish or reddish, are membranous and papery, and in *Polygonum orientale* (princes' feather), have a greenish herbaceous upper portion. With age and on the lower parts of the stems, they tend to split and the upper parts to break off, and in examining this character it is necessary to ensure that one has complete sheaths, otherwise the nature of the marginal fringe cannot be determined.

4. LEAVES

Variable in length and exact shape in some species, the leaves are useful in conjunction with other characters for identification. Usually $\pm$ entire, stalked or stalkless, they may be lance-shaped, oblong, egg- or heart-shaped; the nature of the leaf bases, whether wedge-shaped, rounded, or with pointed or rounded basal lobes, is of importance. A basal rosette is present in *Rumex* (docks) but absent in *Polygonum* (willow weeds), again a useful feature in distinguishing these two groups. Glands or minute perforations occur on the underside of leaves, e.g., *Polygonum hydropiper* (water pepper), while surfaces may be hairless or with spreading or appressed hairs, especially along the main veins on the under side; curved hairs, forwardly directed, occur on the margins of some species of *Polygonum*. Whether the margins are wavy or puckered is of importance in differentiation, more especially in *Rumex*. Taste of the foliage is useful too; *Rumex acetosa* (sorrel) and *Rumex acetosella* (sheep's sorrel) are acid tasting, while *Polygonum hydropiper* (water pepper) has a biting, pepper-like taste.

Fig. 1: Characteristic fruits of genera of polygonaceous weeds.
(Diagrammatic: not to scale)

5. FLOWERS

Individual flowers in the main are small and relatively featureless as compared with those of some other groups of weeds. Petals and sepals are not differentiated, the flower or perianth segments being $\pm$ similar in texture, and known as tepals; these may be green, white, greenish-white, pink to crimson, and colour may vary within a species, e.g., *P. persicaria* (willow weed) is usually pink, but white-flowered plants occur. Tepals in *Rumex* (docks) are 6, the outer 3 small and not enlarging in fruit, the inner 3 larger, and becoming conspicuous in fruit; in *Emex*, the tepals are 6, but the outer 3 enlarge in fruit to form rigid spines. In *Muehlenbeckia*, the tepals are 5, usually becoming succulent in fruit; in *Polygonum*, tepals are 5, remaining $\pm$ unaltered in fruit in the willow weed group of species or enlarged and forming wings in the knot-weed group of species. The number of tepals may vary in *Polygonum* from 3 to 6, and is usually 4 in *Polygonum hydropiper* (water pepper).

6. FLOWER HEADS

Flowers are arranged singly or in few-flowered heads in the leaf axils, e.g., *Muehlenbeckia axillaris*, *Polygonum aviculare* (wireweed), the stems appearing leafy to the tip at maturity. In the remaining species, flowers may be in dense cylindrical heads, e.g., *Polygonum persicaria* (willow weed), in sparse-flowered, elongated heads, e.g., *Polygonum hydropiper* (water pepper), or in open, branching heads, e.g., *Rumex* spp., *Polygonum* spp., *Fagopyrum esculentum* (buckwheat). In *Rumex* (docks), the outline shape of the heads may be long with branches lying close to the main axis, e.g., *Rumex crispus* (curled dock), or broad with branches spreading at a wide angle from the main axis, e.g., *Rumex flexuosus*.

The arrangement of individual flowers within the heads merits mention; in *Rumex* (docks), the flowers are arranged in circular clusters (whorls) at intervals along the branches of the heads, usually with small leaves or membraneous bracts subtending the bases of the jointed flower stalk (pedicels). Other than in axillary-flowered species of *Polygonum*, groups of one or more stalked flowers emerge from funnel-shaped bracts or floral sheaths (ochreolae), which somewhat resemble miniature leaf sheaths, the upper margin with or within a fringe of hairs.

7. FRUITS

The fruits proper in this group of weeds are usually brown or black, three-angled or lens-shaped, the surfaces smooth or dotted, dull or shining (Fig. 1). It is the persistent tepals which envelop the fruit at maturity which are of importance in identification, especially in *Rumex* (docks). In many species of *Polygonum*, the persistent tepals are featureless and have no diagnostic value, but in the knot-weed section of the genus the enlargement of the tepals to form wings is an additional useful character. The inner 3 enlarged tepals in *Rumex* with the wing margins either toothed or entire, and the surfaces with or without tubercles (swellings) provide the means for separation of groups of species, and for differentiation of related species (Fig. 2). The sharp-pointed rigid spines of the fruit in *Emex* are diagnostic, as also are the usually succulent fruiting tepals in *Muehlenbeckia*. Attention is drawn to the occurrence of two types of fruit in several species of *Polygonum*; in the same species, and in fact in a single head on one plant, fruits which are triangular in cross-section are found with fruits which are $\pm$ oval in cross-section, indicating that the fruits are not of value in differentiation of some species of willow weed (Fig. 3).

Fig. 2: Fruits of species of *Rumex* (docks). (Diagrammatic: not to scale)

Fig. 3: Fruits of species of *Polygonum* (willow weeds) (Diagrammatic: not to scale)

CHARACTERISTIC FEATURES OF POLYGONACEOUS WEEDS

Despite the variation in botanical characters noted in the preceding section, there are certain constant features which characterize this group of weeds:

- (1) The prominent leaf sheaths (ochreae).
- (2) The absence of separate petals and sepals, and presence of tepals.

- (3) The persistence of the tepals in the fruiting stage, often completely enveloping the fruit proper.
- (4) The fruits commonly three-angled.

WEEDY SPECIES PREVIOUSLY REPORTED FROM NEW ZEALAND

Over the years, a number of species and hybrids have been reported as occurring in New Zealand, these additional to those treated in the key; these entities are listed below, together with the date of record and locality of occurrence. Listed also are names which are not now regarded as valid, the correct name being indicated.

- Polygonum aequale* Lindm. (1940). A segregate of the aggregate species, *P. aviculare* Linn.; this and several other segregates are present in New Zealand, but they have not been separated out and enumerated in the key as it did not appear warranted in a paper of this nature.
- P. aequale* Lindm. subvar. *parvulum* Moss (1940). A segregate of *P. aviculare* agg.
- P. aviculare* Linn. var. *dryandi* Spr. Synonym of *P. plebejum* R.Br.
- P. aviculare* × *hydropiper* (1929, 1940). Several localities.
- P. dryandi* Spr. Synonym of *P. plebejum* R.Br.
- P. fagopyrum* Sm. Synonym of *Fagopyrum esculentum* Moench.
- P. heterophyllum* Lindm. (1940). A segregate of *P. aviculare* agg.
- P. heterophyllum* Lindm. var. *angustissimus* Meissen (1940). A segregate of *P. aviculare* agg.
- P. hydropiper* × *persicaria* (1929, 1940). Several localities.
- P. minus* Huds. (1867, 1870). Almost certainly refers to the native species, *P. decipiens* R.Br.
- P. mite* Schrank (1943). Recorded by this writer; the plants do not belong to this European species, but are luxuriant specimens of the native *P. decipiens* R.Br.
- P. serrulatum* Lag. A name incorrectly applied to the native *P. decipiens* R.Br.
- Rumex conglomeratus* × *crispus* (1929, 1940). Palmerston North.
- R. conglomeratus* × *maritimus*. Stated in 1940 to be the origin of the earlier recorded *R. paluster* Gmel.
- R. conglomeratus* × *obtusifolius* (1929, 1940). Palmerston North.
- R. crispus* × *obtusifolius* (1929, 1940). "This hybrid appears to be fairly common."
- R. limosus* Thuill. Synonym of *R. palustris* Sm.
- R. maritimus* Linn. (1873). Wellington.
- R. paluster* Gmel. Synonym of *R. palustris* Sm.
- R. palustris* Sm. (1878, 1880). Wellington; Canterbury.
- R. scutatus* Linn. Name incorrectly applied in New Zealand to *R. sagittatus* Thunb.
- R. viridus* Sibth. Synonym of *R. sanguineus* Linn. var. *viridus* Sibth.

ACKNOWLEDGEMENTS

Thanks are expressed to K. R. West, Botany Division, D.S.I.R., for the drawings which accompany this paper, and to A. P. Underhill and C. J. Miles, Crop Research Division, D.S.I.R., for making the slides used in the presentation of the paper at the Conference.

BOTANICAL NAMES AND EQUIVALENT COMMON NAMES

* <i>Emex australis</i> Steinh.	Three-cornered jack
* <i>Fagopyrum esculentum</i> Moench.	Buckwheat
<i>Muehlenbeckia australis</i> (Forst.f.) Meissn.	Pohuehue
<i>M. axillaris</i> (Hook.f.) Walp.	
<i>M. complexa</i> (A. Cunn.) Meissn.	
<i>M. ephedroides</i> Hook.f.	
* <i>Polygonum aviculare</i> agg.	Wireweed
* <i>P. baldschuanicum</i> Regel	
* <i>P. capitatum</i> Hamilt. ex Don.	
* <i>P. convolvulus</i> Linn.	Black bindweed
* <i>P. cuspidatum</i> Sieb. et Zucc.	Asiatic knot-weed
<i>P. decipiens</i> R.Br.	
* <i>P. hydropiper</i> Linn.	Water pepper
* <i>P. lapathifolium</i> Linn.	Pale persicaria
* <i>P. orientale</i> Linn.	Princes' feather
* <i>P. persicaria</i> Linn.	Willow weed; red shank
* <i>P. plebejum</i> R.Br.	
* <i>P. polystachum</i> Wallich.	Indian knot-weed
* <i>P. prostratum</i> R.Br.	
* <i>P. sachalinense</i> Schmidt	Sacaline
* <i>Rumex acetosa</i> Linn.	Sorrel
* <i>R. acetosella</i> Linn.	Sheep's sorrel
* <i>R. brownii</i> Campd.	
* <i>R. conglomeratus</i> Murr.	Clustered dock
* <i>R. crispus</i> Linn.	Curled dock
<i>R. flexuosus</i> Sol. ex Hook.f.	Maori dock
* <i>R. frutescens</i> Thouars	Argentine dock
* <i>R. hydrolapathum</i> Linn.	Water dock
* <i>R. obtusifolius</i> Linn.	Broad-leaved dock
* <i>R. patientia</i> Linn.	Patience dock
* <i>R. pulcher</i> Linn.	Fiddle dock
* <i>R. sagittatus</i> Thunb.	Climbing dock
* <i>R. sanguineus</i> Linn.	Bloodwort

* Denotes adventive species throughout this paper.

KEY TO WEEDY GENERA

1. Plants woody, with or without rhizomes; leaves $\frac{1}{4}$ to $2\frac{1}{2}$ in. long; stems prostrate or spreading, or erect, or twining (climbing), or forming dense tangled masses 2
- Plants herbaceous, with or without rhizomes; leaves $\frac{1}{2}$ to 12 in. long; stems prostrate, erect, or twining (climbing); if stems thick and woody below, then 4 to 12 ft tall and leaves large, 4 to 12 in. long 3
2. Fruits usually enclosed in a 5-toothed, whitish or greenish-white succulent cup; if tepals dry, then without wings (common) *Muehlenbeckia*
- Fruits enclosed in persistent, whitish tepals which extend as wings down stalk of fruit (garden escape, rare)
..... **Polygonum baldschuanicum*
3. Fruits with 3 long rigid spreading spines (occasional; coastal N. Id.) **Emex australis*
- Fruits without rigid spreading spines 4

4. Tepals (flower segments) 6, outer 3 small, inner 3 enlarging in fruit, margins entire or toothed, surfaces with or without tubercles (swellings); plants perennial, usually with long-stalked basal leaves (common) *Rumex*
Tepals 5 (occasionally 3 to 6), all similar, scarcely enlarging in fruit (if plants stout and woody below, with rootstocks or rhizomes, stems 4 to 12 ft tall and leaves 4 to 12 in. long, tepals may enlarge with wing-like extensions down stalk of fruit); tap-root slender or roots fibrous, or lower part of stems prostrate and rooting; stems often swollen at nodes 5
5. Leaves with pointed basal lobes directed downwards; plants annual, little branched, not twining (escape from cultivation, or casual, rare) **Fagopyrum esculentum*
Leaves rounded or wedge-shaped at base, or with rounded basal lobes; if basal lobes pointed and backwardly directed, then stems twining (common) *Polygonum*

GENERAL KEY TO WEEDY PLANTS

A. PLANTS TWINING (CLIMBING)

1. Stems twining, herbaceous or woody 2
Stems not twining, prostrate spreading or erect, herbaceous or woody 6
2. Stems herbaceous; leaves with pointed basal lobes, downwardly-directed 3
Stems woody 4
3. Plant annual, convolvulus-like, with slender tap-root; stem slender; tepals in fruit wingless or with very narrow wings (common, cultivated land, waste places) **Polygonum convolvulus*
Plant perennial, with extensive rhizomes and large brownish tubers; stems thick; tepals conspicuously winged, reddish (locally common, coastal and inland, N. Id., n. of S. Id.) **Rumex sagittatus*
4. Fruits enclosed in persistent, whitish tepals which extend as wings down stalk of fruit (garden escape, rare) **Polygonum baldschuanicum*
Fruits usually enclosed in 5-toothed, whitish or greenish-white succulent cup; if tepals dry, then wingless 5
5. Young branchlets and stalks of young leaves with very short hairs (use lens); leaf margins often reddish, usually not wavy (common, hedge-lines, dry river terraces, modified tussock grassland, open rocky places) *Muehlenbeckia complexa*
Young branchlets and stalks of young leaves hairless (use lens); leaf margins usually not reddish, wavy (common, forest margins, bush remnants) *Muehlenbeckia australis*

B. PLANTS NOT TWINING

(a) *Plant with Rhizomes or Stolons*

6. Plant with rhizomes or stolons 7
Plant with tap-root, or fibrous roots, or rootstock 14
7. Stems woody; leaves ¼ to 1 in. long 8
Stems herbaceous, at least in upper part; leaves ½ to 12 in. long 9

8. Stems leafy; leaves egg-shaped, $\pm \frac{1}{4}$ in. long, closely placed on branches; stems not prominently longitudinally ridged (common, riverbeds, gravelly and rocky places, modified tussock grassland) *Muehlenbeckia axillaris*
 Stems leafless or sparingly leafy; leaves narrow-oblong, $\frac{1}{8}$ to 1 in. long, distant from each other on stems; stems longitudinally ridged, sprawling, wiry, $\pm$ zigzag, to 3 ft long (common, e.S.Id.; occasional e.N.Id., coastal, gravelly and rocky places, modified tussock grassland) *Muehlenbeckia ephedroides*
9. Rhizomes slender; some or all leaves with $\pm$ pointed lobes near base, lobes backwardly—or outwardly—directed; acid-tasting; inner fruiting tepals wingless (common) *Rumex acetosella*
 Rhizomes stout, $\frac{3}{16}$ in. or more diameter; leaves wedge-shaped, rounded, or broadly-rounded on each side of insertion of leaf-stalk, never with pointed basal lobes; inner fruiting tepals winged or wingless 10
10. Plant $\frac{1}{2}$ to 2½ ft tall, never shrub-like 11
 Plant 4 to 12 ft tall, shrubby 12
11. Leaves thick, leathery, broad, widest in upper half, margins very wavy and puckered; heads short, dense, branches $\pm$ straight; fruiting tepals with entire margins, each with large tubercle (rare, coastal, N. Auckland) *Rumex frutescens*
 Leaves thin, narrow-oblong, margins flat or $\pm$ wavy; heads open, branches slender zigzag, tangled; fruiting tepals with long teeth, tubercles absent (not uncommon, modified tussock grassland, open places) *Rumex flexuosus*
12. Leaves $\pm$ 3 times as long as broad, to 10 in. long; main lateral veins $\pm$ 20, usually less than $\frac{1}{4}$ in. apart at midrib of mature leaf (garden escape, colony-forming, occasional to locally common) *Polygonum polystachum*
 Leaves never more than 1½ times as long as broad; main lateral veins fewer than 15, $\frac{1}{2}$ to 1 in. apart at midrib of mature leaf 13
13. Stems 4 to 6 ft tall, arching, $\pm$ zigzag, reddish-brown; leaves 3 to 6 in. long, often $\pm$ straight across base, and abruptly narrowed to a drawn-out tip (garden escape, colony-forming, occasional to locally common) *Polygonum cuspidatum*
 Stems 8 to 12 ft tall, erect, greenish, bamboo-like; leaves 6 to 12 in. long; broadly rounded on each side of midrib at base (garden escape, colony-forming, occasional) *Polygonum sachalinense*
- (b) *Plant with Tap-root, or Fibrous Roots, or Rootstock*
14. Fruits with 3, long, rigid, spreading spines; leaves thick (occasional, coastal N.Id.) *Emex australis*
 Fruits without long, rigid spreading spines 15
- (i) *Docks*
15. Tepals 6, outer 3 small, inner 3 enlarging in fruit, margins entire or toothed, surface with or without tubercles (swellings); plants perennial, usually with stout crown and tap-root, and with long-stalked basal (rosette) leaves; stems not or only slightly swollen at nodes; leaves without glands 16

- Tepals 5 (vary 3 to 6), all similar, usually not enlarging in fruit, always without tubercles (swellings); plants annual or perennial, roots tap or fibrous, sometimes lower part of stem prostrate with roots from swollen nodes; rosette leaves absent; stems sometimes swollen at nodes; leaves sometimes with glands on lower surface, or with minute glandular pellucid dots, or with dark markings 26
16. Inner fruiting tepals with toothed margins 17
 Inner fruiting tepals with entire margins or nearly so 21
17. Teeth on margins and apex of inner fruiting tepals all hooked; fruiting tepals reddish; leaves narrow-oblong, often with pointed basal lobes downwardly directed (occasional, grassland) **Rumex brownii*
 Teeth on margins and apex of inner fruiting tepals straight, not hooked; fruiting tepals reddish, green, or brownish; leaves wedge-shaped, rounded, or with broadly rounded base on each side of insertion of midrib 18
18. Basal leaves oblong, with distinct constriction on each side (fiddle-shaped); fruiting heads open, branches tangled (common, roadsides, waste places) **Rumex pulcher*
 Basal leaves oblong or heart-shaped without constriction on each side; fruiting heads open or compact 19
19. Plant short, to 2½ ft tall; head open, branches slender, zigzag, forming an interlaced mass; leaves narrow-oblong, 1 to 5 in. long; apex of inner fruiting tepals drawn out into long slender point, tubercles absent (not uncommon, modified tussock grassland, open places) *Rumex flexuosus*
 Plants tall, 2½ to 6 ft; heads open or dense, branches not forming an interlaced mass; leaves lance-shaped to egg-shaped, ½ to 2½ ft long; apex of inner fruiting tepals sharp, but not drawn out into long slender point, one or more tubercles present 20
20. Base of rosette leaves wedge-shaped; inner fruiting tepals with small teeth near base, each with tubercle (rare, Auckland Province) **Rumex hydrolapthum*
 Basal leaves heart-shaped; inner fruiting tepals with well developed teeth, usually only one tubercle developed (common) **Rumex obtusifolius*
21. Leaves all with pointed, downwardly-directed basal lobes; outer tepals recurved in fruit and lying down fruit stalk, inner tepals with prominent, thin wings; tubercles absent (rare, Canterbury—reported as occasional) **Rumex acetosa*
 Leaves without pointed, downwardly-directed lobes; outer tepals not lying down fruit stalk; tubercles absent 22
22. All inner fruiting tepals with large tubercle 23
 One only inner fruiting tepal with large tubercle, and either two with small tubercles, or two lacking tubercles 24
23. Branches of fruiting head lying close to main axis; clusters of fruits on branches not or little separated, only lower clusters leafy; tubercle covering small proportion of tepal surface, wings broad; basal leaves wedge-shaped at base, margin puckered (common) **Rumex crispus*

- Branches of fruiting head spreading from main axis; clusters of fruits widely separated, all except uppermost leafy; tubercle covering greater part of tepal surface, wings narrow; basal leaves rounded or heart-shaped at base, not or only slightly puckered (common) **Rumex conglomeratus*
24. Clusters of fruits on branches distinctly separated; head with an open appearance; large tubercle occupying practically full width of tepal (reported as infrequent—not seen) **Rumex sanguineus*
 Clusters of fruits on branches not or little separated, except near base; heads with dense appearance; large tubercle occupying less than half the width of tepal, wings broad 25
25. Stalks on basal leaves flat or $\pm$ rounded on upper surface (common) **Rumex crispus*
 Stalks of basal leaves hollowed or channelled on upper surface (garden escape, rare, N.Id.) **Rumex patientia*
- (ii) *Willow Weeds and Allies*
26. Leaves with pointed, downwardly-directed basal lobes; plant annual; head terminal, open (escape from cultivation or casual, rare) **Fagopyrum esculentum*
 Leaves with wedge-shaped, or rounded bases, or basal lobes broadly rounded 27
27. Flowers solitary or in clusters in leaf axils; stems usually prostrate, sometimes wiry and ridged, never rooting at nodes 28
 Flowers in definite heads, long or short, stout or slender; stems prostrate, spreading or erect, sometimes rooting from lower swollen nodes 29
28. Stems wiry; leaf sheaths (ochreae) many-nerved, silvery or colourless in upper half, torn; fruit finely ridged and pitted (common) **Polygonum aviculare*
 Stems not wiry; leaf sheaths (ochreae) few-nerved (± 3), silvery or colourless, torn (reported as local to abundant—not seen) **Polygonum plebejum*
29. Plants $\pm$ shrubby; stems often woody below, 4 to 12 ft tall; leaves prevailing large, 4 to 12 in. long 30
 Plants not shrubby; stems prostrate to erect, to 8 ft tall; leaves $\frac{1}{2}$ to 5 in. long 33
30. Stems, leaf stalks and leaves hairy; leaf sheath often with green herbaceous portion at top; flowers in dense, cylindrical, drooping heads, to 4 in. long, red to crimson (garden escape, occasional) **Polygonum orientale*
 Stems, leaf stalks and leaves hairless 31
31. Leaves ± 3 times as long as broad, to 10 in. long; main lateral veins ± 20 , usually less than $\frac{1}{4}$ in. apart at midrib (garden escape, colony-forming, occasional to locally common) **Polygonum polystachum*
 Leaves never more than $1\frac{1}{2}$ times as long as broad; main lateral veins fewer than 15, $\frac{1}{2}$ to 1 in. apart at midrib of mature leaf 32
32. Stems 4 to 6 ft tall, arching, $\pm$ zigzag, reddish-brown; leaves 3 to 6 in. long, often $\pm$ straight across base, and abruptly narrowed to a drawn-out tip (garden escape, colony-forming, occasional to locally common) **Polygonum cuspidatum*

- Stems 8 to 12 ft tall, erect, greenish, bamboo-like; leaves 6 to 12 in. long, broadly rounded on each side of midrib at base (garden escape, colony-forming, occasional) **Polygonum sachalinense*
33. Leaves arranged in one plane along $\pm$ prostrate, often brownish-hairy stems, egg-shaped, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, short hairy, commonly reddish, with dark purple marking; heads 1 to several, spherical to egg-shaped, $\frac{1}{4}$ to $\frac{1}{2}$ in. long, red (garden escape, occasional, rocky places, footpaths, coastal) **Polygonum capitatum*
 Leaves arranged around stems, not in one plane 34
34. Flower heads compact, dense, oblong-cylindrical, $\frac{1}{4}$ to 4 in. long, $\frac{1}{4}$ in. or more diameter, erect or drooping 35
 Flower heads interrupted or continuous, slender, to $\frac{1}{8}$ in. diameter; erect or drooping 38
35. Stems prostrate, woody; leaf sheaths with whitish hairs upon raised bases, upwardly-directed, appressed to sheath; leaves $\frac{1}{2}$ to 1 in. long, close-set on stems with whitish hairs from raised bases on both surfaces (rare; lake shores, central N.Id.) **Polygonum prostratum*
 Stems erect, or spreading, if prostrate, then hairs on leaf sheaths without raised bases; leaves $\frac{1}{2}$ to 6 in. long 36
36. Stems, leaf stalks and leaves evidently hairy; plant tall-growing, to 6 ft or more; heads stout, drooping, to 4 in. long, red or crimson (garden escape, occasional) **Polygonum orientale*
 Stems, leaf stalks and leaves hairless, or with short curved hairs on leaf margins, and $\pm$ appressed hairs on midrib on underside of leaves, or short spreading hairs on underside of leaves 37
37. Yellowish glands present on stalk of flower head and tepals; leaves usually broadest in lower third, with or without dark marking; flowers usually whitish, occasionally reddish; lower leaf sheaths without evident marginal hairs; fruits flattened (occasional, cultivated land, waste places) **Polygonum lapathifolium*
 Yellowish glands absent on stalk of flower head and tepals; leaves usually broadest about middle, usually with dark marking; flowers usually reddish, occasionally white; all leaf sheaths with evident marginal hairs; fruits of two types—flattened or triangular in cross-section (common, cultivated land, waste places) **Polygonum persicaria*
38. Yellow glands present on tepals; heads elongated, drooping, lower clusters of flowers usually leafy; leaves without dark markings, margins wavy; fruits flattened, or $\pm$ triangular in cross-section (common, wet waste places, drains, riverbeds) **Polygonum hydropiper*
 Yellow glands absent on tepals; heads 1 to 3 in. long, erect or nearly so, distant from leaves; leaves with or without dark markings, margins $\pm$ flat 39

39. Stems slender, $\frac{1}{2}$ to $2\frac{1}{2}$ ft tall; leaves usually with dark marking; flower spikes solitary or paired at ends of branches, very slender; flower clusters in heads giving impression of being alternately arranged along axis, the head appearing regularly toothed (common, swamps, creeks, slowly moving waters) *Polygonum decipiens*

Plant stout, 4 to 9 ft tall; leaves apparently without dark markings; flower spikes several at ends of branches; flowers closely placed, head narrow cylindrical, to 2 in. long (rare, cultivated land, Auckland district)
**Polygonum* sp.

ADDENDUM

Subsequent to completion of this paper, the specimens on which the record for *Rumex hydrolapathum* Linn. was based (Helensville, N. T. Moar and R. Mason 21, Bot. Divn. 65762 — cited in R. Mason, N. T. Moar and R. C. Cooper, *Rec. Auckland Inst. Mus.*, Vol. 4, No. 1, 1950, p. 90) have been examined, and prove to be *R. frutescens* Thouars. This is therefore the first collection of this species from New Zealand, and the name *R. hydrolapathum* should be removed from the adventive flora.