

Ludwigia × *kentiana* E. J. Clement: a new hybrid aquatic

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ABSTRACT

A hybrid *Ludwigia* L. (Onagraceae) found wild in England is described and illustrated: its morphology suggests a parentage of *L. palustris* (L.) Elliott × *L. repens* J. R. Forst., and it probably equates to a plant known to aquaria enthusiasts as *L. × mullertii* hort.

KEYWORDS: hybridisation, vegetative spread, water weed, Onagraceae, Hampshire-purslane.

INTRODUCTION

In September 1995 U. Sutcliffe & Ms A. Sutcliffe found in a round pond on Putney Heath (GR TQ/237.733), Surrey, v.c. 17, England, a waterweed that was identified as *Ludwigia palustris*. Subsequently when Mrs E. Norman revisited the locality, material was sent to me for confirmation and I realised that it differed appreciably from our native species. It was noticeably large and vigorous, and was probably equatable to a plant known by aquarists as *L. × mullertii* hort. (with orthographic variants ranging from *L. × mulertii* to *L. × muellertii*), with a probable parentage of *L. palustris* (L.) Elliott × *L. repens* J. R. Forst. A request for further information contained in a preliminary report (Clement 1997) yielded nothing. I have still not found a botanical description of this taxon nor a validation of the name, nor any other matching taxon, hence my decision to publish herein a new and unambiguous epithet.

This hybrid has not yet been definitely confirmed from a second locality, but further records are expected. Any vigorous *Ludwigia* colony should be sampled after permission to collect has been obtained. The lack of preservation of good, herbarium vouchers has hampered this research paper and it is becoming a recurrent problem in alien plant studies in Britain. The conservation movement has discouraged the collection of all natural history material: photographs, alone, being acceptable - hence there is a dramatic decrease in the collection of herbarium material.

THE PROBABLE PARENT SPECIES

The taxonomy of the two probable parents presents no problems, but their nomenclature calls for some explanation, as considerable confusion exists in the literature.

L. palustris (L.) Elliott (published in 1817) (*Isnardia palustris* L.) has, fortunately, never been a serious nomenclatural or taxonomic problem. At least two varieties have been recognised - e.g. Munz (1961) - but none of them seems worthy of higher status. The statement therein (Munz *op. cit.* p. 215) that in contradistinction to the American forms "the green bands of the hypanthium terminate well below the summit" in the European form seems untrue (see Fig. 1). The word "hypanthium" has, incidentally, different definitions in different books: Stace (1997) says that the hypanthium is *absent* in this genus, but his use of the term "hypanthium" (of an epigynous flower) apparently refers solely to that part of the extension of the receptacle beyond the summit of the ovary. (His glossary fails to make this fact clear).

L. palustris is a widespread native in the northern hemisphere, occurring in W., C. and S. Europe (north as far as New Forest, England), N. Africa, W. Asia, N. and C. America and W. Indies. It is naturalised in southern Africa, S. America, the Pacific area, Hawaii, S.E. Australia and New Zealand. Illustrations may be found in Fig. 1, and in many British and foreign Floras.

L. repens J. R. Forst. (*Isnardia repens* (Sw.) DC.) presents more problems. It was published in Forster (1771) with a query (?) before the specific name - and some authors appear to have

rejected the epithet as being "not accepted by the author" (and hence an invalid name), but Article 34.1 in Greuter *et al.* (1994) makes it very clear that this is not so. The description seems adequate to define the taxon, the question mark indicating merely that Forster was unsure whether his plant was a new species or not. I have not searched for a type specimen: the statement by Stafleu & Cowan (1976) "it is not possible to state where the original Forster herbarium (father and son) is preserved" acted as a deterrent. The entry in Jackson (1893) has also mislead many of the unwary: it falsely equates this species to *L. palustris* as well as misquoting the page number in Forster's work: it should be p. 6 (not 22). This is especially annoying, since this book contains no index of page numbers even for generic names! The homonym *L. repens* Sw. (published in 1797) is synonymous, whereas *Jussiaea repens* L. (1753) is only distantly related (see synonyms below after the key). Finally, the name *L. natans* Elliott (published in 1821) does indeed refer to this plant, and is unambiguous, but is, alas, a later synonym that should not be used, in spite of the recent choice of it by e.g. Garve & Meijden (1997) and Clement (1997).

The species is restricted to S. and S.E. United States, Mexico and the West Indies. It is naturalised in S. Asia and Japan, also recently in Europe e.g. in Spain (Nieto Feliner 1997). Illustrations may be found in, e.g. Britton (1918), Fawcett & Rendle (1926) and Radford *et al.* (1968).

DESCRIPTION OF THE HYBRID

To validate the new epithet proposed herein, a formal diagnosis is required:

Ludwigia* × *kentiana E. J. Clement, **hybr. nov.**

Hybrida probabiliter inter *Ludwigiam palustrem* (L.) Elliott et *L. repentem* J. R. Forst., ab eis speciebus fructibus sterilibus, petalis circa 0.5 mm longis differt.

HOLOTYPE: England, Surrey (v.c. 17), Putney Heath, Round Pond, 6 October 1997. Mrs E. Norman, *s.n.* (**BM**); isotypus in **Herb. EJC**. A glabrous perennial with stems 20–80 cm, prostrate or weakly ascending, often largely or entirely submerged in water, abundantly rooting at lower nodes. Leaves 20–50 × 5–25 mm, opposite, the blade narrowly rhombic-obovate, gradually narrowed to a long petiole, with the margin entire. Flowers solitary in leaf axils, ± sessile. Bracteoles linear, c. 1 mm. Calyx-tube ± cylindrical, 4-sided, uniformly pale green; calyx teeth 4, c. 2 mm, deltoid. Petals 4, minute (c. 0.5 mm) cream, ± spatulate, fugacious (usually dropping off as soon as the buds open); stamens 4, 0.8 mm long; style 0.8 mm long with subglobose stigma divided into 4 indistinct lobes. Fruit a capsule, partially developing and then dropping off, the ovules not expanding.

The epithet *kentiana* is for D. H. Kent in appreciation of his great assistance to me for over 30 years during my studies on the adventive flora of Britain. The aquarium trade may be disappointed that I have not upheld the name that they currently use. The epithet that I have chosen is intended to cover all variations of the hybrid, some undoubtedly not worthy of any aquarium tank. The best clone (preferably the original, correct one!) can be more accurately named as *L. × kentiana* 'Mullertii', which may be legitimately abbreviated to *L.* 'Mullertii' - the simple quotes being the current convention to indicate a cultivar (i.e. equal to cv. *Muellertii* in older literature). At present, I refrain from allocating the clone described here as true *L.* 'Mullertii'. An English name is also called for - Kent's Hampshire-Purslane seems appropriate.

TABLE 1. COMPARISON OF *LUDWIGIA PALUSTRIS*, *L. × KENTIANA* AND *L. REPENS*

	<i>L. palustris</i>	<i>L. × kentiana</i>	<i>L. repens</i>
Leaf blade	Widest near its middle	Widest in uppermost third	Widest close to its apex
Bracteoles	0–0.5 mm, free	c. 1 mm	1–2 mm, shortly adnate to ovary
Sepal lobes	About as long as broad	Longer than broad	Much longer than broad
Petals	Absent	0.5 mm, cream	3–5 mm, yellow
Fruit	Subrotund and persistent; with 4 dark green bands of	±Cylindrical and caducous; uniformly pale green	Cylindrical and persistent; uniformly greenish yellow

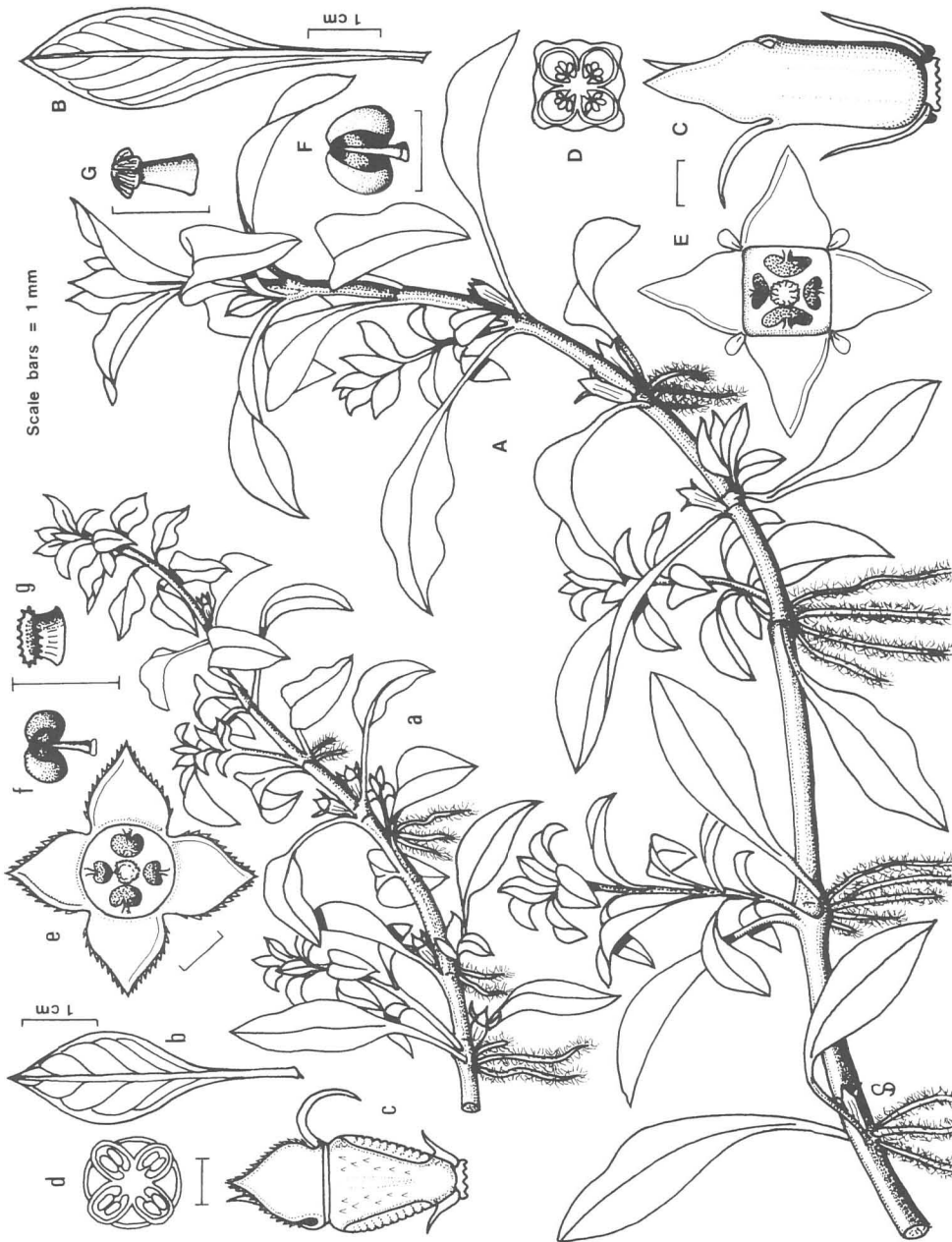


FIGURE 1. *Ludwigia × kentiana* (A–G) and *L. palustris* (a–g) del. D. J. P. Smith © 1998.
 A, a, habit of plant; B, b, leaf from middle of stem; C, c, side view of immature fruit with persistent calyx teeth;
 D, d, transverse section of immature fruit showing ovules; E, e, view of flower from above; F, f, stamen; G, g,
 stigma and style.

L. × kentiana can be distinguished from its probable parents by the characters shown in Table 1.

Several North American Floras e.g. Fernald (1987) claim that *L. repens* has no petals - the virtually invariable state in herbaria since the petals drop so quickly - but there seems to be no truth in this statement (Godfrey & Wooten 1981). I notice that Radford *et al.* (1968) claim "petals absent" in their description, but their wiser key says "petals present". Clement (1997) claimed (1-4 petals for the hybrid, but a more careful study of fresh specimens revealed an invariable number of just 4. The illustration by D. J. P. Smith (Fig. 1) clearly shows these differences between *L. palustris* and *L. × kentiana*; in addition other minutiae may be noted, though less easily put into words, including the shape of the anthers. The provenance of the plants drawn are, respectively, near Hatchet Pond, New Forest, (v.c. 11, S. Hants) and Putney Heath.

D. J. P. Smith also drew my attention to the fact that two of the opposing anthers, in both taxa, are noticeably larger than the other two - two of them may be better described as staminodes, a fact that I have not seen mentioned elsewhere.

KEY TO *LUDWIGIA* SPECIES OCCURRING IN EUROPE

The following key, partly based on Raven (1963), is provided to alert readers to the possibility of other species occurring in Britain in the future. All are typically perennial aquatics, although annuals, shrubs, and even a tree occur within the genus. Only *L. palustris* is native in Europe and it shows a markedly southern distribution.

- | | | |
|----|---|-----------------------|
| 1. | Leaves opposite; flowers ± sessile; petals 4, 0-4 mm | 2 |
| 1. | Leaves alternate; flowers pedicelled; petals 5(-6), 7-30 mm | 4 |
| 2. | Petals absent | <i>L. palustris</i> |
| 2. | Petals present, but fugacious | 3 |
| 3. | Petals c. 0.5 mm, cream | <i>L. × kentiana</i> |
| 3. | Petals 3-5 mm, yellow | <i>L. repens</i> |
| 4. | Petals white or pale yellow, with a dark yellow claw | <i>L. adscendens</i> |
| 4. | Petals bright yellow throughout | 5 |
| 5. | Calyx-tube finely hairy to glabrous; petals 7-16 mm | <i>L. peploides</i> |
| 5. | Calyx-tube hirsute | 6 |
| 6. | Stem and leaves pubescent; petals 15-24 mm | <i>L. grandiflora</i> |
| 6. | Stem and leaves ± glabrous; petals 7-15 mm | <i>L. hexapetala</i> |

The four additional species not discussed above are:

Ludwigia adscendens (L.) Hara (*Jussiaea repens* L.)

S. and S.E. Asia and tropical Australia. (a casual? in The Netherlands). Illustrations may be found in, e.g. Soerjani (1987).

L. peploides (Kunth) Raven

Tropical and subtropical N. and S. America, and perhaps native in Australia. Naturalised in S.W. France and New Zealand. A variable plant, sometimes divided into four subspecies. Illustrations may be found in, e.g. Godfrey & Wooten (1981) and Hoch (1993).

L. grandiflora (Michx.) W. Greuter & Burdet

(*L. uruguayensis* (Camb.) Hara; *Jussiaea repens* sensu Coste, non L.)

Pantropical and subtropical. Naturalised in S. France, Spain, The Netherlands and Belgium. Illustrations may be found in, e.g. Coste (1903) and Godfrey & Wooten (1981).

L. hexapetala (Hook. & Arn.) Zardini, Gu & Raven

Tropical America. Records exist for S. France and E. Spain, but they are probably referable to the closely allied *L. grandiflora*. Some authors, such as Hoch (1993), provide an illustration but clearly do not separate these two species even as varieties.

Other potential escapees are also grown in aquaria - e.g. *L. arcuata* Walter × *L. repens* (Kasselman 1985). The first parent has flowers on long pedicels 15-35 mm long, and this influence would presumably be evident in any hybrid that it forms.

DISTRIBUTION OF THE HYBRID

The hybrid *L. \times kentiana* is probably widespread in aquaria in Britain and elsewhere, but no previous record of its escape into a wild location has come to my notice: it may well have arisen in an aquarium in Europe. Indeed, since both parents appear to be invariably self-pollinating in the wild, with the anthers and stigmas in juxtaposition and the consequent 100% set of fruits, the hybrid may have been deliberately made by human manipulation. The parents overlap in their native range only in S. and S.E. United States and the West Indies, but I can trace no mention of a hybrid in the N. American literature.

It is possible, however, that one (or more) of the current records for *L. repens* in Europe are better incorporated within *L. \times kentiana*, even though a different clone may be involved and so not perfectly matching the description given herein.

In England, I have seen and confirmed only the Putney Heath record, but the following are *likely to be* either the same taxon or possibly pure *L. repens*. The voucher for v.c. 59 in **BM** possesses only flower buds: it is certainly not pure *L. palustris*, as labelled. The earliest British record appears to be in 1927 (from v.c. 59).

v.c. 11 (S. Hants). Southampton, Sholing, Miller's Pond, GR SU/45.10, 1958–1965, *R. P. Bowman*. Probably an aquarist's introduction; pond now infilled.

v.c. 14 (E. Sussex). Seaford Head, South Hill Barn, GR SZ/505.980, 31 August 1991, *P. D. L. Maurice*. In a dew pond.

v.c. 16 (W. Kent). Tonbridge, GR TQ/5.4, 1989–1990, *S. Melville (MNE)*. In a garden pond, but not deliberately planted.

v.c. 18 (S. Essex). Earls Path Pond, Epping Forest, GR TQ/415.967, 3 August 1976, *K. J. Adams & J. O. Mountford*. In an acidic pond.

v.c. 59 (S. Lancs). Manchester Docks, GR SJ/8.9, 1927, *L. Adams (?LTN)*. By Failsworth Canal, GR SD/8.0, 14 May 1960, *Miss V. Gordon (LIV)*; *ibid.*, 26 July 1960, *J. E. Lousley & Rev. C. E. Shaw (BM)*. Plentiful for several years.

A map showing all *Ludwigia* records for the British Isles is given by Preston & Croft (1997), but all the above colonies, except Seaford Head, are probably now extinct.

Surprisingly, the v.c. 9 (Dorset) record predicted by Clement (1997) to be this alien has since been determined by D. Pearman & myself as pure (and presumably native) *L. palustris*: it has been seen in 1996–1998 in a newly dug-out old pond at Sutton Holms, Edmonsham (Pearman 1999).

DISCUSSION

Conservationists may well be alarmed to hear that yet another vigorous aquatic plant is threatening to oust our native plants from almost any pond, particularly if acidic. The history of this hybrid, to date, suggests that it does not jump from site to site as readily as *Crassula helmsii* (Kirk) Cockayne and also that extreme cold weather appears to exterminate it completely - but a wary eye on its progress is necessary. Indeed, according to Salisbury (1972), even our native *L. palustris* "probably ...often behaves as an annual and 'perennates' perhaps only when the winter is not severe". The ability of the hybrid *Ludwigia* to climb up and over other low vegetation in ponds is a little worrying, while the tendency for warmer summers will certainly favour its spread.

More than one clone of the hybrid may have occurred in Britain, each colony spreading solely by vegetative propagation, and with a probable variation in hardiness (and hence its potential threat). A glance at Clement & Foster (1994) reveals that this is the first alien *Ludwigia* to be found in the British Isles, but others seem likely to follow: worldwide, 82 species are currently recognised (Raven 1963) and many of them have weedy tendencies.

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Mrs E. Norman and P. Stanley enabled D. J. P. Smith to observe material in peak, fresh condition for his beautiful artwork presented here. Additional help has been freely given by R. P. Bowman, Miss V. Gordon, D. Pearman, Miss P. Miles, M. Mullin, A. Underhill and B. Wurzell.

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