

LUDWIGIA DECURRENS WALT. — A NEW RICE-FIELD WEED IN SRI LANKA

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Abstract : *Ludwigia decurrens*, a member of the family Onagraceae, is a new weed in the rice-fields of Sri Lanka. It has probably been introduced to the country relatively recently. This weed is presently found in great abundance in the rice-field habitats of Colombo and Kalutara districts, and to a lesser extent in Gampaha, Kegalle, Ratnapura and Galle districts. The weed produces large numbers of seeds which are easily spread by irrigation water and rain water. Successful management of the spread of this weed will depend on applying control measures before the plant comes into bloom and sets seeds. Its botanical features are described.

1. Introduction

The genus *Ludwigia* belongs to the family Onagraceae, a family that has many temperate and sub-tropical species which are mainly herbs, but includes some shrubs as well. The family Onagraceae also includes the genus *Jussiaea* well-known to botanists. However, due to evidence of many close relationships and inter-connections between *Jussiaea* and *Ludwigia*, the two genera have now been merged and the name *Ludwigia* accepted as the generic name most tenable for the aggregate genus.⁴

Trimen⁵ in the Handbook to the Flora of Ceylon (1893-1900) described two species of *Ludwigia*, namely *Ludwigia parviflora* Roxb. and *Ludwigia prostrata* Roxb., as well as two species of *Jussiaea*, namely *Jussiaea repens* L. and *Jussiaea suffruticosa* L. as occurring in Sri Lanka. He also noted that a variety of *J. suffruticosa* L. var. β *subglabra* Thw., appeared so different from the type (*J. suffruticosa*) and stated that he was inclined to make a second species. Trimen also stated that *L. prostrata* was very rare and that he had only seen the specimen collected by Moon at Kalutara.

Alston¹ in his Supplement to Trimen's Flora of Ceylon, viz. Vol VI (1931) recorded four species of *Jussiaea* for Sri Lanka. He accepted the previously described *J. repens* L., but did several alterations to the other species recorded by Trimen. The name of *J. suffruticosa* sensu Trimen was altered to *Jussiaea peruviana* L., while the name *J. suffruticosa* L. was retained for the variety *subglabra* noted earlier. Alston also described a new

species, *Jussicea tenella* Burm. f. Of the *Ludwigia* species, Alston altered the name of *L. parviflora* sensu Trimen, to read as *Ludwigia perennis* L.

Chandrasena and Amarasinghe³ in a preliminary communication, presented evidence of seven species of *Ludwigia* found growing naturally in Sri Lanka. They also favoured the view that the name *Ludwigia* be accepted as the valid name in describing these species, following Raven. The seven species described were: *Ludwigia adscendens* (L.) Hara (= *J. repens*), *Ludwigia peruviana* (L.) Hara (= *J. peruviana*), *Ludwigia octovalvis* (Jacq.) Raven (= *J. suffruticosa*), *L. perennis*, *Ludwigia hyssopifolia* (G. Don) Exell (= *J. tenella*), *Ludwigia uruguayensis* (Camb.) Hara and *Ludwigia decurrens* Walt. They stated that *L. prostrata*, which Trimen himself had not collected, was never found by them despite extensive searching and preferred to leave this species out. Their list included *Ludwigia uruguayensis* and *L. decurrens*, two species which had not been previously recorded from Sri Lanka. Whilst *L. uruguayensis* was of rare occurrence, *L. decurrens* was reported as a new rice-field weed of considerable importance, already well established in the Wet Zone.³

The objective of the present paper is to record the occurrence, botanical nature, present distribution and significance of *L. decurrens*, which is a new species for Sri Lanka.

2. Botanical Characteristics of *Ludwigia decurrens*

Ludwigia decurrens Walt. Fl. Carolin. 89. 1788; Raven, Reinwardtia 6:347. 1963.

= *Jussiaea decurrens* (Walt.) Dc., Prod. 3: 56. 1828; Munz, Darwiniana 4: 198; Brenan in Hutch. & Dalz., Fl. W. Trop. Afr. ed. 2, 1:169. 1954.

A small erect herb up to 1.5 m tall, well-branched, woody when mature, stem glabrous, 4-winged from the decurrent leaf bases and the wings 1–2 mm wide. Leaves alternate, glabrous, sessile or sub-sessile, narrowly lanceolate to elliptical in shape, 2–12 cm long, 0.2–3 cm broad at broadest point, acute to acuminate at apex, cuneate at base, venation reticulate with 12–15 main veins on each side of mid-rib, sub-marginal vein prominent (Figure 1): Flowers borne singly in upper leaf axils, sessile; Sepals 4, lance-ovate, 7–10 mm long, 2–3 mm broad, glabrous; Petals 4, bright yellow, broadly ovate, 8–14 mm long, 6–10 mm broad at broadest point; Stamens 8, in two whorls, epipetalous whorl slightly shorter; filaments 1–3 mm long, anthers 1–2 mm long with sub-versatile attachment. Pollen shed in tetrads. Style 2–3 mm long, stigma globose, green 1–2 mm thick. Ovary inferior, 1–1.2

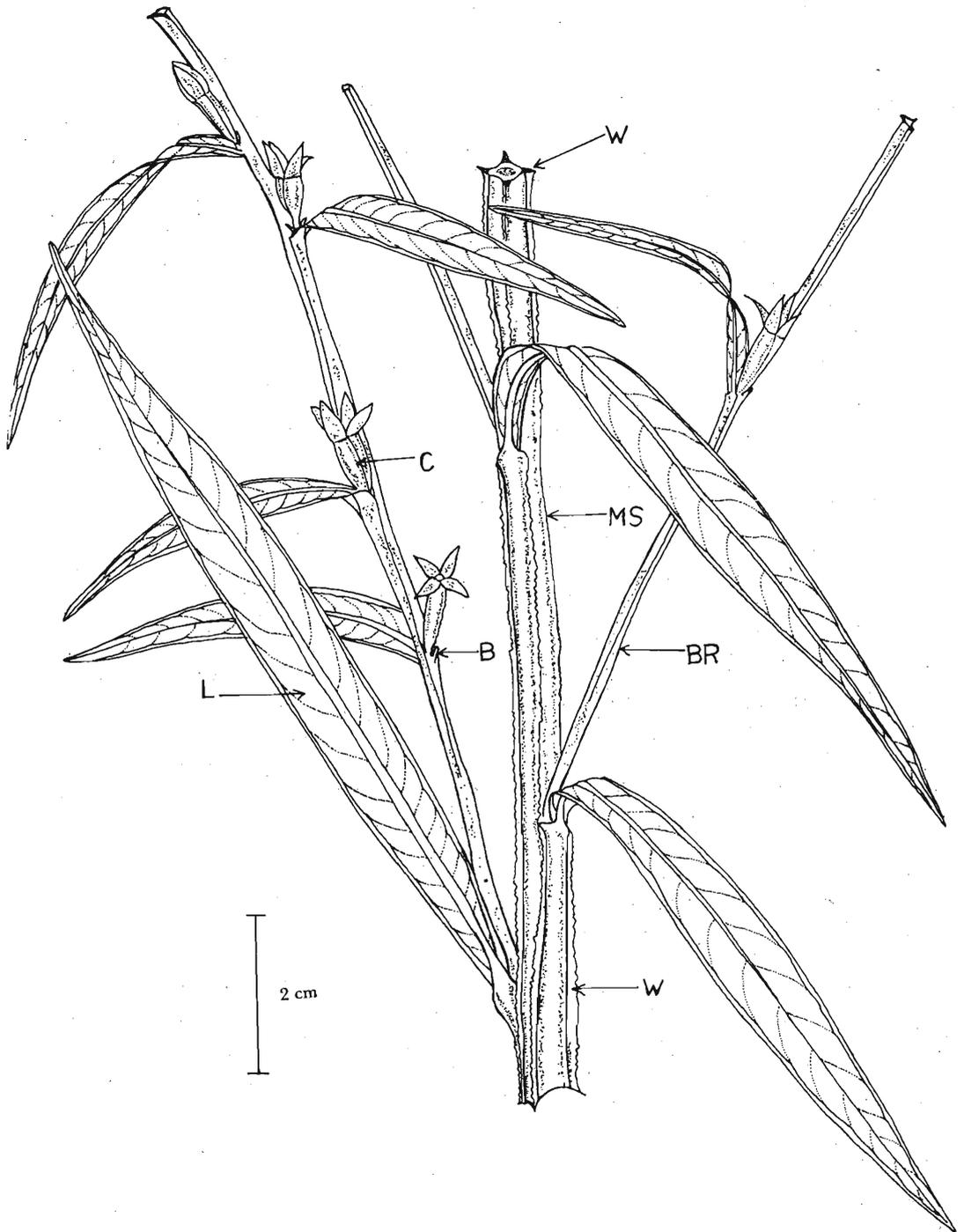


Figure 1. Habit of *Ludwigia decurrens* Walt. (x 1). main stem (MS), branch (BR), leaf showing reticulate venation and sub-marginal vein (L), bracteoles at base of ovary/capsule (B), capsule (C), wings from decurrent leaf bases (W).

mm long 4-sided, obconical winged along ridges, glabrous, carpels 4, locules 4, placentation axile with numerous ovules per locule. Bracteoles at base of ovary 1 mm long. Fruit, a 4-sided capsule, obconical in shape, 1–4 cm long, 0.3–1 cm wide at summit, glabrous, on a short pedicel up to 1 cm long, green to reddish-brown in colour; irregularly and readily loculicidal. Seeds pluriseriate in each locule, free, pale brown, numerous, elongate obovoid, 0.3–0.4 mm long, 0.2–0.3 mm thick (Fig. 2).

The identity of the specimen was confirmed by Dr. Elsa Zardini, a Taxonomist attached to the Missouri Botanical Gardens, St. Louis, Missouri, U.S.A., where voucher specimens bearing numbers, Chandrasena 17, 18, 65, 66, 69, 71, 74, 114, 115, 116, 119, 146, 149 and 150, have been deposited. Specimens of this new species record (Chandrasena, 49, 123) have been deposited at the National Herbarium, Royal Botanic Gardens, Peradeniya, as well.

3. Distribution of *L. decurrens* in Sri Lanka

Up to the end of the Yala season (April–August) of 1986, the author has found *L. decurrens* in four districts of the low-country wet zone growing in rice-fields and nearby wet marshy lands. Heaviest infestations were seen in the rice-fields on the eastern side of the Colombo district, (viz. Maharagama, Homagama, Avissawella) and in the Kalutara district around Bombuwela, Nagoda, Matugama and Agalawatta. Isolated patches of the weed were found in the Gampaha district, north of Colombo, in several fields close to the district boundary. In the Galle district, only one population of *L. decurrens* was found in 1985/1986, and this was in a village called Ampegama. This population was one of the heaviest infestations of the weed seen by the author anywhere, and covered an area of 2–4 ha of rice-fields as the most dominant weed. In 1986 and 1987, the species was collected from several isolated locations in the Kegalle and Ratnapura districts. These occurrences were always close to the main roads (viz. Colombo-Kandy; Colombo-Ratnapura via Avissawella), suggesting that the weed was spreading slowly to other districts as well.

Whether the plant occurs in the dry zone and montane zone is not yet known to the author, who has not done any extensive searching for the species in these areas, up to the time of writing this paper.

4. Significance

The commonest and by far the most troublesome broad-leaved weed in rice-fields in the Wet zone of Sri Lanka is *L. hyssoipifolia*, a close relative of

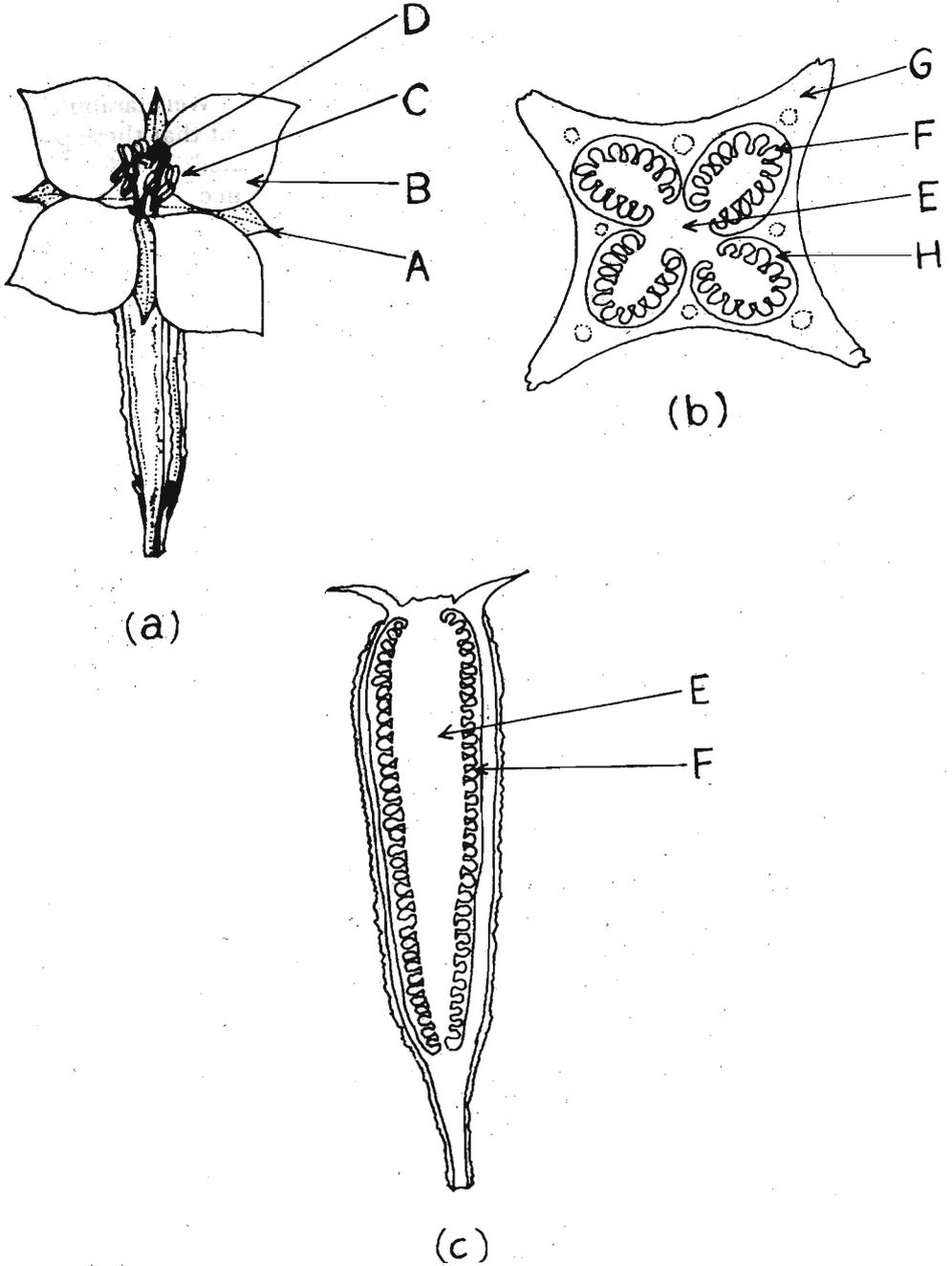


Figure 2. Floral characteristics of *Ludwigia decurrens* Walt.
(a) Flower (x 2)
(b) T.S. Ovary (x 4)
(c) L.S. Ovary (x 4)
Sepals—4 (A), Petals—4 (B), Stamens—8 (C), Stigma (D), axis of ovary (E),
Ovules— numerous (F), Carpels—4 (G), Locules—4 (H).

L. decurrens.² Along with *L. hyssopifolia*, *L. decurrens* has also become a rice-field weed of considerable importance. The majority of the local farmers interviewed by the author did not distinguish between the two species and referred to the plants by the local names 'Bim-Uru' or 'Wel-Karabu'. The origin of the former word could be due to a popular belief that these plants arise from the dead bodies of a common soil insect called 'Bim-Ura'. The origin of the latter name is apparently the resemblance of the mature capsules of both *Ludwigia* spp. in rice-fields to 'cloves' (*Eugenia caryophyllata*), the well known spice, called 'Karabu' in Sinhala. Some of the local farmers expressed the view that the larger-flowered *L. decurrens* was not known until a few years ago, possibly suggesting a relatively recent introduction and rapid spread.

L. decurrens is known to be native to the New World from South Eastern United States to Northern Argentina.⁴ Raven⁴ is of the opinion that it has been introduced recently to Japan and Africa. This may be true for parts of Asia too, including Sri Lanka.

The plant produces a very large number of seeds. Investigations carried out by I.S. Fernando in the Department of Botany, University of Colombo (personal communication) has shown that the average number of seeds produced per capsule of *L. decurrens*, in 50 different plants, to be 996 ± 55 . There is little doubt that the seeds are carried to nearby fields and lands by irrigation water, rain water or by agricultural implements. Once the seeds are set, rapid spread is inevitable and appears to be one of the main causes of its success as a weed.

Farmers and agricultural-extension officers interviewed by the author stated that both *L. hyssopifolia* and *L. decurrens* are easily controlled by MCPA (4-chloro-2-methylphenoxy acetic acid) and paraquat (1, 1'-dimethyl-4, 4'-bipyridylum), two of the commonest foliage-applied herbicides used in rice-culture in Sri Lanka. However, these species when mature are not easily uprooted by hand-weeding, due to their deeply penetrating root systems. The control of *L. decurrens* therefore depends upon the judicious use of clean seed (rice) for sowing in areas where the weed is not present, and by avoiding the use of irrigation water from infested fields to supply water for non-infested fields.

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