Australian representatives of *Macrostelia* transferred to *Hibiscus* (Malvaceae), with the description of a new species

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ABSTRACT
The Australian species of *Macrostelia* fall within the circumscription of *Hibiscus* and the two taxa concerned are transferred to the latter genus. A new species is described. Three new names are proposed: *H. tozerensis* Craven & B.E. Pfeil (based on *M. grandifolia* Fryxell), *H. macilwraithensis* (Fryxell) Craven & B.E. Pfeil (based on *M. grandifolia* subsp. *macilwraithensis* Fryxell), and *H. propulsator* Craven & B.E. Pfeil (for the new species).

KEY WORDS
Malvaceae,
Hibiscus,
Macrostelia,
Australia.

RÉSUMÉ
Transfert des représentants australiens de Macrostelia *dans le genre* Hibiscus *(Malvaceae) et description d'une espèce nouvelle.*
L'espèce australienne de *Macrostelia* relève de la circonscription d'*Hibiscus* et les deux taxons concernés sont transférés dans ce dernier. Une nouvelle espèce est décrite. Trois noms nouveaux sont proposés : *H. tozerensis* Craven & B.E. Pfeil (basé sur *M. grandifolia* Fryxell), *H. macilwraithensis* (Fryxell) Craven & B.E. Pfeil (basé sur *M. grandifolia* subsp. *macilwraithensis* Fryxell) et *H. propulsator* Craven & B.E. Pfeil (pour l'espèce nouvelle).

MOTS CLÉS
Malvaceae,
Hibiscus,
Macrostelia,
Australie.

HOCHREUTINER erected the genus *Macrostelia* Hochr. to accommodate two new malvaceous species from Madagascar, *M. calyculata* Hochr. and *M. involucrata* Hochr. (HOCHREUTINER 1952). The new genus was primarily distinguished by HOCHREUTINER from other genera of Malvaceae in having the petals proximally connate into a long tube; in other genera the petals are connate only at the very base. Subsequently a third Malagasy species was added to the genus, *M. laurina* (Baill.) Hochr. & Humbert (HOCHREUTINER 1955). FRYXELL extended the geographic range of *Macrostelia* to Australia and described a new species, *M. grandifolia* Fryxell, in which two subspecies were recognised, *M. grandifolia* subsp. *macilwraithensis* Fryxell and the autonymic subspecies (FRYXELL 1974).

The Australian macrostelias were included in an analysis of chloroplast sequence data from the *ndhF* coding region and the non-coding *rpl16* intron from a comprehensive sample of species of *Hibiscus* L. and other genera of Hibisceae (PFEIL *et al.* 2002). *Macrostelia* consistently nested within *Hibiscus* and, in a combined analysis of *ndhF* and *rpl16* data, grouped in a well supported clade that also included species of *H.* sections *Bombicella* DC., *Hibiscus* and *Lilibiscus* Hochr., including the type of *Hibiscus*, *H. syriacus* L. Unfinished studies utilising *ndhF* data suggest that the Malagasy species of *Macrostelia* also nest within the clade containing the Australian *Macrostelia* species but are not grouped with them (PFEIL and BAUM unpublished data). In assigning the new Australian species to *Macrostelia*, FRYXELL (1974) noted that the Australian species lacked the degree of adnation of petals to staminal column that was characteristic of the Malagasy species. Our observations are in accordance with those of FRYXELL and we have further observed that the degree of petal adnation manifest in the Australian *Macrostelia* species is comparable to that in all the *Hibiscus* species we have examined. Taking their morphology into account with the results of the molecular sequence research, it would seem that the two groups of *Macrostelia* species are not as closely related as previously believed.

Of the other morphological features discussed by FRYXELL (1974) wherein *Macrostelia* differs from *Hibiscus*, the most distinctive is that of leaf venation. *Macrostelia* has pinnately veined, unlobed leaves whereas *Hibiscus* fide FRYXELL (1974) has palmately veined and usually palmately lobed leaves (although *Hibiscus papuodendron* Kosterm., at least, has pinnately veined leaves [pers. obs.]). Both types of leaf venation may occur in other groups of Malvaceae, however. FRYXELL (1999) records the leaves of *Pavonia* subg. *Goetheoides* (Gürke) Ulbr. as being pinnately veined (the term penninerved is used by FRYXELL) but the species of the other subgenera of *Pavonia* apparently have palmate venation. Pinnate venation in fact occurs within three clades of a broadly defined *Hibiscus*, namely *Azanzae* s.l. (*H. papuodendron* nests herein), *Trionum* s.l. (*Pavonia* nests here), and *Hibiscus-Bombicella* s.l. (*Macrostelia* nests here) (PFEIL *et al.* 2002). The molecular support for the basic structure and membership of these three clades is strong in both cpDNA (PFEIL *et al.* 2002) and nDNA (PFEIL *et al.* 2004) and pinnate venation must be regarded as a character with poor predictive power as to classification. It is pertinent that, even in species of *Hibiscus* s.l. with palmate venation, the palmate condition applies only to the proximal veins (which often are much more developed than the other veins); the distal veins are pinnate. In this group of plants the difference between palmate and pinnate venation may be more reflective of the relative degree of development of the veins than of a divergence in basic structure *per se*.

It is our conclusion that *Macrostelia* included within *Hibiscus* may be a better taxonomic placement than if it is kept separate. Given the shared character states of apically free styles, capitate stigmas, sterile staminal column apices, lack of gossypol, and capsular fruit, pinnate venation is a weak character upon which to maintain a genus. However, given that the molecular systematics of the Malagasy species of *Macrostelia* have not yet been studied to the same extent as the Australian species, *Macrostelia* is being maintained in the interim for its Malagasy representatives. The necessary nomenclatural transfers of the Australian taxa are effected below. A new Australian macrostelioid species, *H. propulsator*

Craven & B.E. Pfeil, is described also. Although FRYXELL's two subspecies of *M. grandifolia* are generally similar in their leaves, the flowers are very different (Fig. 1). The epicalyx segments are free in subsp. *macilwraithensis* and 6-7 in number, whereas in subsp. *grandifolia* they are connate for about half their length and 4-5 in number. In addition, the petals of the former are spreading at anthesis and white, and of the latter are erect at anthesis and pale pink. These distinctive differences are maintained in wild and greenhouse-grown material and no intermediate forms have been seen, thus we believe that subsp. *macilwraithensis* warrants recognition at species rank. The collector of two collections of *M. grandifolia*, the late L.J. BRASS, indicated through specimen label annotation (on *Brass 19352*, *19353*) that the species was dioecious. FRYXELL suggested that the species might best be described as gynodioecious as the "staminate" herbarium specimen he examined had fully developed styles and stigmas (FRYXELL 1974). The flowers of the Australian representatives differ in epicalyx and corolla form and are illustrated in Figure 1. Observations by us of living plants of each of the Australian species shows that the species have hermaphrodite flowers but are strongly protandrous. At early anthesis, the style branches are small, erect and appressed to each other, with the stigmatic hairs not readily evident; at this stage the anthers have dehisced and pollen is available for dispersal. Over the next few days, the style branches elongate, separate and spread widely such that the stigmas, which by now have well developed stigmatic hairs, may be brought into contact with the stamens. In nature, it is expected that insects probably would have removed the pollen from a flower prior to the stigmas becoming receptive; thus ensuring that the flower outcrosses. In the greenhouse, however, the pollen remains with the anthers as insects that potentially could pollinate flowers are excluded; selfing presumably occurs as we have noted that fruit is commonly produced on one accession of subsp. *macilwraithensis*. The Australian "*Macrostelia*" species differ from the other Australian species of *Hibiscus* in that they commonly have several flowers in each leaf axil.

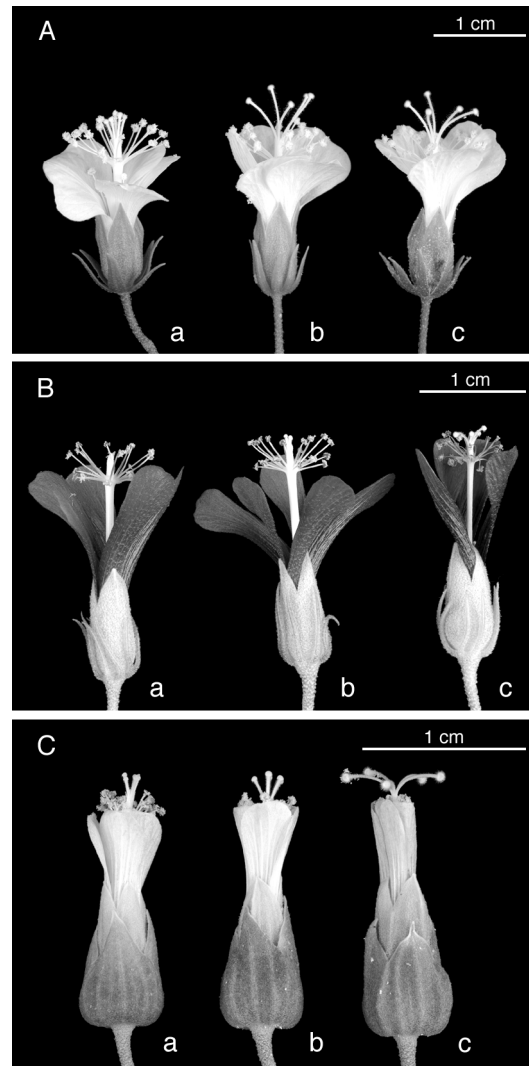

FIG. 1. — Flowers of Australian ***Hibiscus***: **A**, ***H. macilwraithensis*** (Fryxell) Craven & B.E. Pfeil; **B**, ***H. propulsator*** Craven & B.E. Pfeil; **C**, ***H. tozerensis*** Craven & B.E. Pfeil; **a**, flower at early anthesis; **b**, flower at mid-anthesis; **c**, flower at late anthesis. From plants cultivated at Canberra, Australia.

1. Hibiscus macilwraithensis (Fryxell) Craven & B.E. Pfeil, **comb. et stat. nov.**

Macrostelia grandifolia subsp. *macilwraithensis* Fryxell, Austral. J. Bot. 22: 191 (1974), basionym. — Type: Australia: Queensland, McIlwraith Range, *c.* 18 km NE by E of Coen, 12 Oct. 1962, *Smith 11783* (holo-, BRI *n.v.*).

2. Hibiscus propulsator Craven & B.E. Pfeil, **sp. nov.**

A H. macilwraithensi (Fryxell) Craven & B.E. Pfeil *segmentis epicalycis linearibus usque linearielliptici et corolla rubra, et* H. tozerensi Craven & B.E. Pfeil *epicalyce 7-9-segmentatis et ad basim divisis et corolla effusa rubraque differt.*

TYPUS. — Australia: Queensland, Temple Bay, *c.* 2 km NW of Bolt Head, 12°15'S, 142°04'E, 12 July 1991, *Forster 8937* (holo-, BRI; iso-, A, B, BISH, BO, CANB, G, K, L, LAE, MEL, P, QRS).

Shrub to 3 m tall, multistemmed from below ground level; branchlets densely stellate-hairy, the internodes 0.3-2.5 cm long; stipules filiform, deciduous, 0.25-1.2 cm long. Leaves alternate, 4.5-28 cm long, 1.5-9 cm wide; lamina narrowly obovate to narrowly subpanduriform, the base rounded to cordate, the apex acuminate to rounded, the margin distantly serrate (often obscurely so), the venation pinnate with 6-10 primary veins on each side of the midrib, weakly discolorous, the abaxial and adaxial surface sparsely and minutely stellate-hairy (excepting the midrib which is more densely stellate-hairy than the remainder of the surface) with the hairs predominantly or exclusively inserted on the midrib and veins; petiole 0.2-0.5 cm long, stellate-hairy. Flowers 1-2(-3) per leaf axil; peduncle and pedicel combined 0.6-2.8 cm long, the articulation about one-third to half-way from the peduncle base, stellate-hairy; epicalyx segments 7-9, linear to linear-elliptic, 0.7-1.2 cm long, free to the base, stellate-hairy; calyx narrowly ovoid, valvate, 5-lobed (2 or 3 lobes sometimes tardily separating from the adjacent lobe), 1-2 cm long, the lobes 0.3-0.6 cm long, stellate-hairy; petals 5, imbricate, adnate to the ovary/staminal column for *c.* 0.3 cm but otherwise free, spathulate with the apex obliquely truncate, 2.2-3.7 cm long, deep rose pink, wine-red or red, stellate-hairy on the abaxial surface; staminal column 2.4-3.2 cm long, white, 5-toothed at the apex, stellate-hairy proximally and glandular-hairy for the remainder (especially so on the apical teeth); stamens 20, in a whorl of 10 pairs (the stamens of each pair superposed), the whorl 0.2-0.3 cm below the apex of the staminal column, the filaments spreading-ascending, 0.3-0.6 cm long, white; style branches 5, erect and appressed to each other at anthesis and later separating, elongating and recurving, 0.3-0.8 cm long, very pale pink, the stigmas capitate, hairy; ovary conical, 0.5 cm long, stellate-hairy, 5-loculate with *c.* 6 ovules per locule. Fruit not seen. — Figs 1B; 2.

DISTRIBUTION AND ECOLOGY. — *Hibiscus propulsator* occurs on the eastern side of Cape York Peninsula in the Olive River-Bolt Head region; recorded mainly in open forest (of *Neofabricia*, *Thryptomene* and *Xanthostemon* with emergent *Araucaria cunninghamii*), low closed forest, in semideciduous vine thicket, evergreen vine forest, and rainforest; recorded substrates are reddish sandy soil, and white sand; recorded landscapes are sand dunes, and a creekline in a narrow gorge.

ETYMOLOGY. — The specific epithet is derived from the Latin *propellere*, propel, in reference to the propeller-like form of the petals. The red, propeller-like petals immediately distinguish this species from *H. macilwraithensis* and *H. tozerensis*, which appear to be its closest relatives.

SPECIMENS EXAMINED. — AUSTRALIA: *Webb & Tracey 13532*, Queensland: N of Olive River mouth, 12°07'S, 143°05'E (BRI); *Webb & Tracey 13531*, between Stoney Point and Mosquito Point, 12°25'S, 143°16'E (BRI); *Clarkson & Neldner 8808*, Temple Bay, 0-1 km W of Bolt Head, 12°15'S, 143°05'E (CANB, DNA, K, L, MBA, MEL, NY, PERTH, QRS); *Forster 19355*, same locality (BRI, MEL); *Gray 6853*, same locality (CANB, QRS); *Gray 6856*, same locality (CANB, QRS); *Gray 6889*, same locality (QRS); *Sankowsky & Sankowsky 1144*, same locality (BRI).

3. Hibiscus tozerensis Craven & B.E. Pfeil, **nom. nov.**

Macrostelia grandifolia Fryxell, Austral. J. Bot. 22: 189 (1974), replaced synonym. — Type: Australia: Queensland, Cape York Peninsula, Tozer Range, N end, 29 June 1948, *Brass 19353* (holo-, BRI *n.v.*; iso-, A *n.v.*, CANB).

A new epithet is required as *grandifolia* is preempted in *Hibiscus* by *H. grandifolius* Hochst. ex A.Rich.

FIG. 2. — Holotype of ***Hibiscus propulsator*** Craven & B.E. Pfeil.

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