

# *Hibiscus cummingii* Wannan (Malvaceae), a new species from north-east Queensland

Bruce S. Wannan<sup>1</sup>

## Summary

Wannan, B.S. (2024). *Hibiscus cummingii* Wannan (Malvaceae), a new species from north-east Queensland. *Austrobaileya* **14**: 27–35. The new species *Hibiscus cummingii* is described and illustrated. This species is restricted to the Hervey Range near Townsville with only a single population known. It is unusual amongst Australian *Hibiscus* (section: *Furcaria*) in having prominent nectaries on the calyx. The new species is illustrated with photographs, and notes are provided on how it differs from related species. A key is provided for *Hibiscus* section *Furcaria* in Queensland.

Key Words: Malvaceae; *Hibiscus*; *Hibiscus* section *Furcaria*; *Hibiscus cummingii*; *Hibiscus diversifolius*; *Hibiscus reflexus*; flora of Australia; flora of Queensland; new species; identification key

<sup>1</sup>Australian Tropical Herbarium, James Cook University, Cairns Campus, McGregor Road, Smithfield, Queensland 4878, Australia. Email: bswannan@bigpond.com

## Introduction

*Hibiscus* section *Furcaria* DC. is a speciose group in Australia with more than 30 species described (Wilson 1974; Wilson & Craven 1995; Wilson 2006; Craven *et al.* 2003, 2016; Badry *et al.* 2017; Wannan 2022). Species in this section are morphologically distinguished from other *Hibiscus* by the presence of a calyx with prominent thickened midrib and margins, and the frequent occurrence of aculeate trichomes (prickles) on stems, epicalyx and calyx (Hochreutiner 1900; van Borssum Waalkes 1966; Wilson 1994; Craven *et al.* 2003). Support for *Hibiscus* section *Furcaria* is also provided by genomic differences (Wilson 1994) and genetic sequence data (Pfeil *et al.* 2002; Hanes *et al.* 2024).

*Hibiscus cummingii* Wannan sp. nov. was recognised during recent investigations of *H.* section *Furcaria* collections at CNS by its prominent nectaries on a glabrous calyx. It is recorded from a single locality on the eastern slopes of the Hervey Range near Townsville. It is an upright, perennial shrub with large white flowers that grows amongst the granite boulders.

## Materials and methods

Observations were made from herbarium specimens and living plants in cultivation at Speerwah near Cairns. The species description and comparisons with other species from *Hibiscus* Section *Furcaria* are based on herbarium specimens at BRI, CANB, CNS, MEL and NT. Seeds for scanning electron microscopy were mounted on stubs using double sided tape and were platinum coated. Micrographs were collected in secondary electron mode on a Hitachi SU5000 FE-SEM operating at 3kV accelerating voltage at the Advanced Analytical Centre, James Cook University in Townsville.

Length by width measurements are indicated as length × width mm. Dimensions are inclusive, i.e. 1.0–1.7 is given as 1–1.7. The terms *climax leaves* and *distal leaves* are used here, *sensu* Craven *et al.* (2003), to describe the larger, mid-stem leaves and upper, smaller leaves subtending the flowers, respectively. The term *pedicel* is used here to describe the stalk of a flower; however, in some cases, this is jointed and referred to as an *articulation*

in species other than that described below, where it is *inarticulate*. This does not include the frequent abscission layer at the base of the pedicel near the subtending leaf axil.

Broad geographical abbreviations used in the text include NQ (north Queensland, i.e. Townsville region northwards to Cape York), CQ (central Queensland south of Townsville to approximately Rockhampton); SEQ (southeast Queensland).

## Taxonomy

### *Hibiscus cummingii* Wannan sp. nov.

Similar to other Australian *Hibiscus* section *Furcaria* species but differing by the following combination of characters: perennial shrub; calyx with prominent nectaries; inarticulate pedicels; upward facing large white flowers with a maroon throat, capsule with long simple hairs which overlie shorter simple hairs. **Type:** Australia, Queensland, NORTH KENNEDY DISTRICT: Hervey Range, near Townsville, 27 October 2010, *B.S. Wannan 7198* (holo: BRI [AQ1046838 comprising 2 sheets]).

**Cotyledons** hypogeal, broad ovate, 15–18 × 16–19 mm, apex retuse, base rounded, 3-veined, glabrous on upper surface, simple hairs underneath; first leaves toothed, 33–40 × 24–30 mm, base cordate, apex acute, penniveined with basal veins extending halfway up lamina, hairs simple on upper and lower surfaces. Stem with simple hairs developing into aculeate hairs. **Perennial shrub** to 3 m tall, evergreen; stems up to 4 cm diameter developing light brown bark with lenticels in older plants. **Branchlets** green glabrous, very rarely with tubercle-based simple aculeate hairs on older branches. **Stipules** subulate, unlobed, eventually deciduous, glabrous, 3–6 mm long on climax leaves, up to 7 mm long on distal leaves subtending flowers. **Climax leaves** with petioles 25–60 mm long; pulvinus near lamina; mostly glabrous except for a dorsal line of fine non-aculeate simple and stellate hairs; occasionally with 1–5 simple aculeate hairs on older petioles; laminae either oblong to lanceolate and simple (100–160 × 30–50 mm), or 2 or 3 lobed with mid-lobes 130–200

× 50–60 mm, lateral lobe(s) 40–155 × 11–40 mm, lateral lobes 70% of the length of the mid-lobe; slightly discoloured; both surfaces glossy-satin with scattered aculeate hairs (simple & stellate) on midvein, side veins and laminae, sparse simple and stellate non-aculeate hairs below; foliar nectary at base 7–10 mm long, narrow elliptical; midvein raised with 10–20 pairs of side veins on central lobe or simple entire laminae, and 6–10 pairs on lateral lobes in trilobed laminae; margins serrate, teeth < 1 mm, spaced 3–8 mm; base mostly obtuse, rarely acute. **Distal leaves** with petioles 15–20 mm; pulvinus absent or barely observable; mostly glabrous except for a dorsal line of fine non-aculeate simple and stellate hairs; occasionally with 1–5 simple aculeate hairs on older petioles; laminae mostly unlobed, 70–140 (–180 in cult.) × 15–55 mm, lanceolate, slightly discoloured; foliar nectary up to 15 mm long, on lamina base and extending onto petiole, narrow elliptical; base acute to attenuate with indumentum as for climax leaves; midvein raised with 15–20 pairs of side veins; margins serrate, teeth < 1 mm, spaced 4–5 mm. **Flowers** solitary in axils, chasmogamous, 11–16 cm diameter, opening to face skywards, opening after midday (in cultivation) and lasting a single day. **Flower buds** up to 40 mm in length × 20 mm at the base, white streaked with mauve. **Pedicels** 10–35 mm long at anthesis, inarticulate, glabrous; 13–35 mm long in fruit. **Epicalyx** present, persistent, with 6–9 segments; segments at anthesis 18–25 mm long, sitting at 45° to the calyx, narrow triangular less than 2 mm wide, fused for *c.* 3 mm at the base, 2/3 length of calyx at anthesis, with up to 10 scattered simple aculeate hairs per segment. **Calyx** 20–30 mm long at anthesis, not splitting, 5-lobed with the lower ¼–½ fused, not adnate to the corolla and not falling with it after anthesis; lobes triangular with prominent marginal ribs and midrib, strongly keeled at the base, outer surface green with upper parts maroon, mostly glabrous (rarely with a few simple aculeate hairs *Cumming 22887*), inner surface with fine crinkled non-aculeate simple and stellate hairs to 1 mm on ribs and midrib, base of calyx with long simple non-aculeate hairs to 1.5 mm; apex acute; a single nectary per

lobe 3–5 × 1 mm, sometimes reddish. **Petals** obovate, free to base, 90–100 × 65–70 mm, **strongly reflexed at anthesis**; inner surface white with 35–40 mm maroon basal eye-spot, pink streaks on the outside. **Staminal column** straight, *c.* 25 mm long, with capitate light maroon pollen clusters to 2 mm, up to the apex of the staminal column. **Style** *c.* 40 mm long, extending up to 15 mm beyond the end of the staminal column, mauve, 5-branched, each branch *c.* 3 mm long with a capitate stigma that is covered by fine maroon hairs to 0.7 mm; ovary 10 mm long, with appressed simple hairs to 1 mm. **Epicalyx in fruit** up to 15–25 mm, sitting at 90° to calyx (in fresh material). **Calyx in fruit** not distinctly inflated, 25–32 mm, distinctly longer than epicalyx. **Fruits** capsular, dry dehiscent, ovoid, 18–23 mm long, including *c.* 3 mm beak, with simple non-aculeate appressed hairs to 1.2 mm over much finer simple hairs to 0.2 mm; dehisced capsules with attenuate apices. **Seeds** 2 or 3 per locule, trigonous reniform, up to 5.5 × 4 mm, dark brown with low striate pattern and irregular groups of pectinate hairs. **Figs. 1–7.**

**Additional specimens examined:** Queensland. NORTH KENNEDY DISTRICT: Hervey Range, May 2004, *Cumming* 22887 (BRI); *ibid.*, May 2007, *Cumming* 24763 (BRI, CNS); *ex horto* Speewah, May 2023, *Wannan* 7280 (CNS, NSW); *ibid.*, Oct 2023, *Wannan* 7305 (BRI, CNS, MEL, NSW, CNS); *ibid.*, Nov 2023, *Wannan* 7307 (CNS, DNA, MEL).

**Distribution and habitat:** *Hibiscus cummingii* is endemic to north Queensland and known only from the Hervey Range near Townsville where it occurs in a single population in open woodland dominated by *Blakella tessellaris* (F.Muell.) Crisp & L.G.Cook, *Eucalyptus platyphylla* F.Muell., *E. tereticornis* Sm. and *Lophostemon grandiflorus* (Benth.) Peter G.Wilson & J.T.Waterh. associated with large granite boulders.

**Phenology:** *Hibiscus cummingii* has been collected in flower in May and October. The flowering period at Speewah (*ex horto*) is between December and November.

**Notes:** *Hibiscus cummingii* differs from other species in *Hibiscus* section *Furcaria* by its combination of prominent nectaries on the calyx, large white corolla which is presented facing upwards, inarticulate pedicels,

aculeate hairs rare on branches, petioles and pedicels, and perennial habit. The seeds of *Hibiscus cummingii*, with pectinate hairs and underlying low striate pattern, suggest an affinity with *Hibiscus heterophyllus* Vent.

*Hibiscus cummingii* is unique amongst north Queensland *Hibiscus* in always having large prominent nectaries (3–5 mm long) on the calyx. Calyx nectaries have been recorded for *Hibiscus diversifolius* subsp. *rivularis* (Bremek. & Oberm.) Exell (van Borssum Walkes 1966; Badry *et al.* 2017), but they are very small (less than 0.5 mm) and usually difficult to observe, being obscured by the dense calyx indumentum. Additionally, their occurrence is variable on calyx segment parts of the same flower and indeed varies from flower to flower. Perhaps as a consequence, calyx nectaries have not been included in the descriptions of this subspecies by Zich *et al.* (2020) or Cooper & Cooper (2004, as *H. diversifolius* Jacq.). Calyx nectaries have also been described for the yellow flowered southern subspecies: *Hibiscus diversifolius* subsp. *diversifolius* by some authors (Wilson 1974; Mitchell & Norris 2000), but not by others (Bentham 1863; Bailey 1901; Beadle 1982; Ross 1986; Wheeler 1987; Green 1994). Although somewhat more observable in this subspecies, they are also small (*c.* 0.5 × 0.2 mm) and obscured by hairs. Elsewhere in Australian species from *Hibiscus* section *Furcaria*, calyx nectaries occur only in *H. reflexus* Craven, F.D.Wilson & Fryxell (from the Kimberley) and the occasionally naturalised *Rosella* (*H. sabdariffa* L.). *Hibiscus cummingii* differs from *H. reflexus* by its infrequent aculeate hairs on stems, longer stipules, longer and thinner leaves, much larger epicalyx, externally glabrous calyx, and much larger corolla.

The identification key below relies on patterns of seed morphology in Queensland species. Seed morphology has been shown to be diagnostically useful in recognising *Hibiscus* species as well as genera within the Malvaceae (Mwachala 2009; Abid *et al.* 2016; Ilakiya & Ramamoorthy 2021; Khalik *et al.* 2021). Investigations as part of this study suggest that there are three main



**Fig. 1.** *Hibiscus cummingii*. Stem showing bark (Wannan 7307). Photo: B.S. Wannan.



**Fig. 3.** *Hibiscus cummingii*. Flower bud with ants at calyx nectaries (Wannan 7280). Photo: B.S. Wannan.



**Fig. 2.** *Hibiscus cummingii*. Abaxial surface of climax and distal leaf with nectaries (Wannan 7280). Photo: B.S. Wannan.



**Fig. 4.** *Hibiscus cummingii*. Flower at anthesis showing stamens, extended style and maroon eye spot (Wannan 7305). Photo: B.S. Wannan.





**Fig. 5.** *Hibiscus cummingii*. Flower at anthesis showing calyx, epicalyx, pedicel (Wannan 7305). Photo: B.S. Wannan.

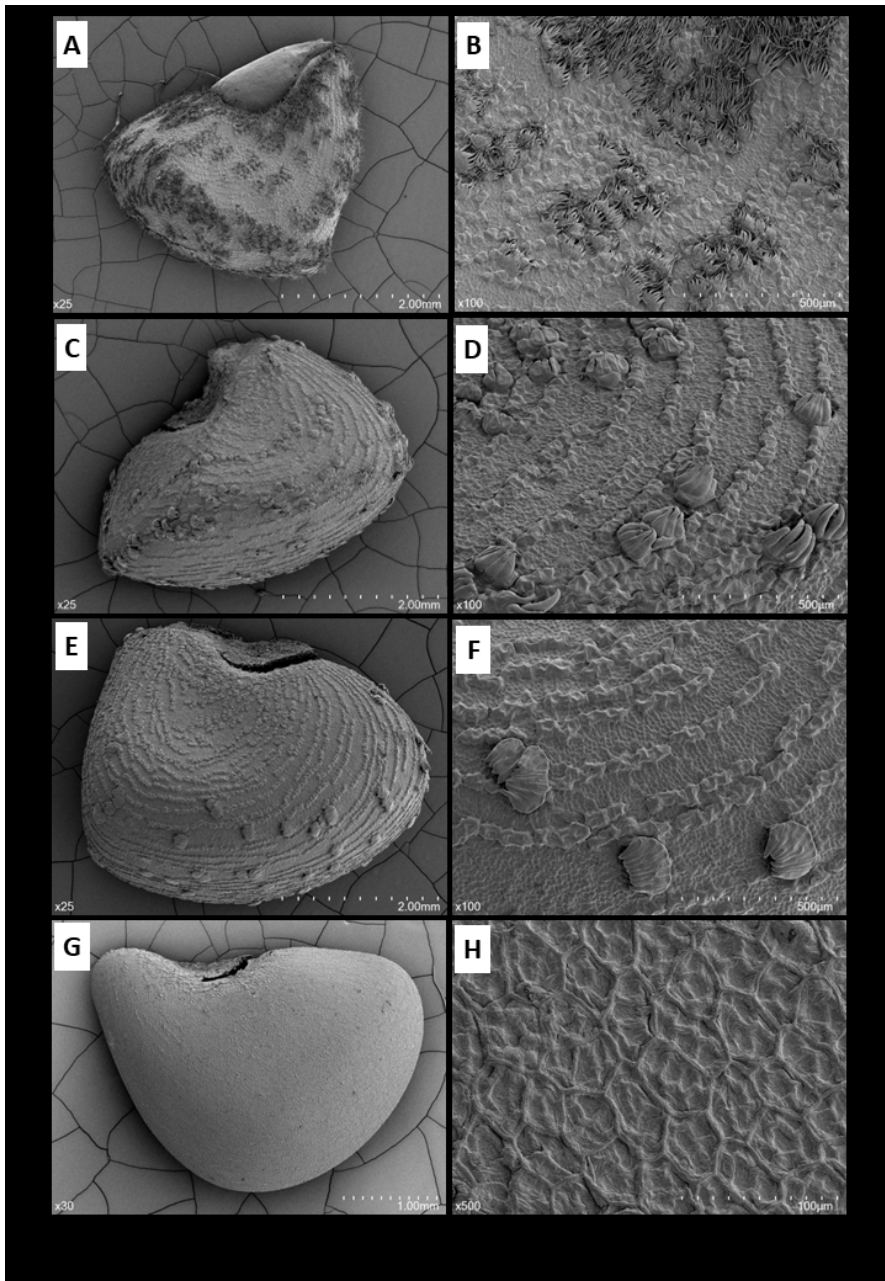


**Fig. 6.** *Hibiscus cummingii*. Fruiting capsule (Wannan 7198). Photo: B.S. Wannan.

species groups evident from seed morphology in Australian taxa of section *Furcaria* (Fig. 7A–H), namely: the *H. meraukensis* Hochr. group (with *H. graniticus* Wannan and *H. saponarius* Craven) whose seeds are characterised by a caruncle and pectinate hairs, the *H. diversifolius* group which is characterised by smooth non-carunculate seeds, and the *H. heterophyllus* group (with *H. cummingii*, *H. divaricatus* Graham, *H. forsteri* F.D.Wilson, *H. sankowskyorum* Craven, *H. splendens* C.Fraser ex Graham, *H. townsvillensis* Craven, *H. zonatus* F.Muell.) which are characterised by non-carunculate seeds with pectinate hairs. Pectinate hairs refers to the comb-like hairs on the seed (Fig. 7B, 7D & 7F).

**Conservation status:** *Hibiscus cummingii* has a restricted distribution on the Hervey Range with an estimated population size of fewer than 1,000 individuals in a single population that has an area of occupancy of less than 20 km<sup>2</sup> (IUCN 2012). Further survey work is required to ascertain the actual extent of occurrence for the species, together with a formal conservation status listing.

**Etymology:** The Latin species epithet honours the Townsville botanist Russell Cumming (b. 1959) who first collected this species.



**Fig. 7.** Seeds in Australian *Hibiscus* sect. *Furcaria*. **A & B.** Seed with caruncle, pectinate hairs, lineate ridges (*H. saponarius*: Clarkson 7181 CNS). **C & D.** Seed without caruncle with pectinate hairs and lineate ridges (*H. divaricatus*: Wannan 7275, CNS). **E & F.** Seed without caruncle with pectinate hairs and lineate ridges (*H. cummingii*: Wannan 7305, CNS). **G & H.** Seed smooth without caruncle, and no pectinate hairs (*H. diversifolius* subsp. *rivularis*: Gray 5886, CNS). Photos: K. Blake.

**Key to taxa in *Hibiscus* section *Furcaria* for NSW & Qld**

- 1 Capsule with two layered indumentum, seeds without caruncle, plants growing in forest margins . . . . . **2**
1. Capsule with layer of simple hairs or glabrous, seeds with caruncle (**Fig. 7A & B**), plants growing in savanna habitats. . . . . **3**
- 2 Plants above two metres in height, pollen maroon, seeds with pectinate hairs and obvious lineate ridges (**Fig. 7C–F**) . . . . . **5**
2. Plants below two metres in height, pollen yellow, seeds smooth without pectinate hairs (**Fig. 7G & H**) . . . . . **13**
- 3 Perennial shrub to 2.5 metres with pink flowers, inarticulate pedicels, no stellate hairs . . . . . **Hibiscus graniticus**
3. Annual shrub to 1.5 metres with white flowers, articulate pedicels, stellate hairs on leaves, pedicels and calyx. . . . . **4**
- 4 Climax leaves up to 18 × 18 cm, leaf nectary present, epicalyx 6–22 mm, pedicels 10–20(–30) long; stems, petioles, pedicels and calyx with coarse, simple acuminate hairs to 1.5 mm long. . . . . **Hibiscus meraukensis**
4. Climax leaves up to 7 × 11 cm, leaf nectary mostly absent, epicalyx 9–12 mm, pedicels 23–85 mm long; stems, petioles, pedicels and calyx with simple non-acuminate hairs to 3 mm long . . . . . **Hibiscus saponarius**
- 5 Corolla yellow. . . . . **6**
5. Corolla white or pink . . . . . **7**
- 6 Distal leaf lamina (under flowers) linear to narrow-lanceolate (length/breadth: 8–14), with petiole 5–10 mm and 22+ side veins either side of midrib, side veins 60–90 degrees; calyx with acuminate simple hairs; capsule 16–21 mm long. . . . . **Hibiscus divaricatus**
6. Distal leaves (under flowers) lanceolate, (length/breadth: 5–8), with petiole 10–20 mm and 12–20 side veins either side of midrib, side veins 45–60 degrees; calyx without acuminate simple hairs; capsule 20–30 mm long . . . . . **Hibiscus heterophyllus NQ**
- 7 Climax leaves deeply lobed, greater than 2/3 leaf length . . . . . **Hibiscus heterophyllus SEQ to NSW**
7. Climax leaves not lobed or lobes less than 2/3 the leaf length . . . . . **8**
- 8 Capsule with non-acuminate simple hairs (to 1.2 mm), **but no** underlayer of fine stellate hairs, pedicels not articulate . . . . . **9**
8. Capsule with non-acuminate simple hairs (to 2.5 mm) over a shorter finer layer of stellate hairs, pedicels articulate. . . . . **10**
- 9 Calyx with prominent nectaries, distal leaves (subtending flowers) with 8–20 side veins either side of midrib, stem mostly glabrous, capsule 18–23 mm long . . . . . **Hibiscus cummingii**
9. Calyx without nectaries, distal leaves (subtending flowers) with 5 or 6 side veins either side of midrib, stem with stellate acuminate and non-acuminate hairs, capsule 14–18 mm long. . . . . **Hibiscus zonatus**

- 10 Leaf nectary absent; stems, petioles and leaves covered by dense stellate non-aculeate hairs, velvet-like . . . . . **Hibiscus splendens**
10. Leaf nectary present; stems with simple and stellate aculeate hairs; petioles with only dorsal line of simple and stellate non-aculeate hairs; leaves with scattered stellate hairs . . . . . **11**
- 11 Evergreen tree, branches with aculei which are tipped with a single hair, pedicels 45–60 mm . . . . . **Hibiscus townsvillensis**
11. Deciduous or evergreen shrub, branches with aculei which are tipped by stellate hairs, pedicels 13–38 mm . . . . . **11**
- 12 Evergreen shrub, growing on granite substrates; staminal column *c.* 45 mm long . . . . . **Hibiscus sankowskyorum**
12. Deciduous shrub, growing on sandstone substrates; staminal column 20–30 mm long. . . . . **Hibiscus forsteri**
- 13 Flowers purple, NQ . . . . . **Hibiscus diversifolius subsp. rivularis**
13. Flowers yellow, CQ to NSW . . . . . **Hibiscus diversifolius subsp. diversifolius**

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