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## THE REINSTATEMENT OF *SOLANUM SHANESII* F. MUELL. SECTION *LYCIANTHES* (SOLANACEAE) WITH DISCUSSION OF ITS SIGNIFICANCE.

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### Abstract

New collections of *Solanum* from northern Queensland have enabled the problem of the identity of *S. shanesii* to be resolved. This species belongs to *Solanum* sect. *Lycianthes* (Dun.) Wettst. which has not previously been recorded for Australia. The closest relatives of *S. shanesii* are found in Central America. A further collection of *Solanum* sect. *Lycianthes* from Queensland may represent a new species.

### Introduction

*Solanum shanesii* F. Muell., Fragm. 6 (1868) 144, was based on fruiting collections by Dallachy and O'Shanesy from Queensland. Three collections remain at MEL. The first, MEL 12403, has four labels, (a) "B' *Solanum shanesii* ferd. v. Mueller Rockhampton;" (b) "*Solanum shanesii* F. v. M. 435 *Solanum* Mores Creek fruit red"; (c) "17th March 1863"; (d) "*Solanum shanesii* ferd v. Mueller Rockhampton D". There is a duplicate of this collection at K labelled (a) "Flora Australiensis named by Mr. Bentham Vol. IV, Page 448, *S. shanesii* F.M.", (b) "*Solanum shanesii* F. Mueller Rockhampton Dallachy Herb. F. Mueller 1868". The second collection MEL 12404 is labelled (a) "*Solanum shanesii* F. Muell. Fragm. VI 144 (1868) Rockhampton, Q'land, O'Shanesy 25.2.1868" and (b) "No. 6 ser. 1, *Solanum* erect and slender 6-8 feet bark light coloured and slightly blistered bark berry shining red ½" diameter 2 celled rare Rockh. R. O'Shanesy 25.2.1868 not prickly". The sheet MEL 12404 was proposed as lectotype by Symon (1981b).

The original collections lack flowers and were placed in *Capsicum* (Symon, 1981 a, b) because of the shallow lobing of the fruiting calyx; he believed them to be early feral plants, the absence of flowers making it difficult to identify with certainty. The suggestion that the collections might be a *Capsicum* is supported by the shallow lobing of the calyx and lack of teeth below the rim. There has been no recent fertile collections until those described below.

In December 1981 a flowering and fruiting specimen was collected by J.R. Clarkson (4217) and in March 1983 further good material was gathered (Clarkson 4585, 4586).

### Affinities of *Solanum shanesii*

The species is clearly distinctive among Australian *Solanum* and has no apparent close relatives. Comparing it with other treatments of the genus showed affinities to section *Lycianthes*: this was suggested by the geminate leaves, simple hairs, axillary pedicellate inflorescence, cupulate calyx with scarcely developed lobes, rather thick, fleshy, strongly reflexed corolla lobes and slightly unequal anthers. As such it would constitute the first record for this section in Australia.

### The status of *Lycianthes*

The genus *Lycianthes* has been recognised as a segregate from the very large group *Solanum*. However, even in recent publications the acceptance of the genus is by no means general. The only monograph on *Lycianthes* as a genus was by the specialist on the Solanaceae, Bitter (1920). His use of generic status was followed by D'Arcy (1973), Gentry and Standley (1974) and Deb (1980). Other specialists in the family, including Morton (1944, 1976), Macbride (1962) and Hunziker (1979) recognised *Lycianthes* only at lower taxonomic rank, within *Solanum*. Because there are no features which reliably distinguish *Lycianthes* from *Solanum* I favour the latter treatment. However for discussion the sectional names used by Bitter (1920) will be followed. The species of *Lycianthes* in S.E. Asia belong to two sections of the subgenus *Polymeris* (Dun.) Bitter. Section *Asio-melanesia* Bitter typified by *L. biflora* (Lour.) Bitter, has two species in New Guinea and up to ten ill-defined and variable taxa in the rest of S.E. Asia. All of these may be excluded from comparisons with *S. shanesii* on the basis of growth habit, pubescence and calyx characters. The second group comprises subgenus *Cypellocalyx* Bitter with about 16 species in S.E. Asia and particular concentrations of species in New Guinea. All of these species may be excluded from comparisons with *S. shanesii* on the basis of growth habit, leaf shape, pubescence and calyx characters. However, these last taxa are more closely related than the previous group of species. All remaining taxa of *Lycianthes* occur in South America, Central America or Mexico. The great majority of the New World species may be readily excluded on the basis of growth habit, pubescence of calyx form except Bitter's subgenus *Polmeris* (Dun.) Bitter, section VII *Synantheroides* Bitter, which consists of six species from Mexico through Guatemala to Panama. Of these species the Queensland taxon seems most closely related to *L. synanthera* (Sendtn.) Bitter. Despite the name of the section and of the latter species, not all have anthers joined in a tube cf. *L. heteroclita* (Sendtn.) Bitter, *L. ceratocalycia* (Donn. Sm.) Bitter and *L. synanthera*.

Specimens of *L. synanthera* and the later described *L. escuintlensis* (Coul.) D'Arcy have been seen and a close relationship to *S. shanesii* appears evident. However, until more detailed morphological comparisons are made it is not possible to state the degree of affinity.

Chemical analysis of the leaves of *S. shanesii*, Ripperger *et al.* (1984) have shown that it contains the alkaloid soladulcidine. As this is known to occur in other species, e.g. *S. dulcamara* L., section *Dulcamara* Dumont, it does not in itself contribute to a separation of *Solanum* and *Lycianthes* though very little is known of the chemistry of the latter section.

### Biogeographical significance

The apparent morphological relationship of *Solanum shanesii* reveals a fifth Australian species of the Solanaceae which can be considered discordant in the Australian flora in having close relations in the Mexico to Central America area. Previously *Datura leichhardtii* F. Muell. ex Benth., Haegi (1976), *Physalis minima* L., Symon (1981b), *Solanum callium* C.T. White ex R. Henderson (1977) and *Solanum erianthum* D. Don, Symon (1981a) have been noted.

Long distance dispersal of all five species is not considered likely. Neither *Datura leichhardtii*, *Solanum callium* nor *S. shanesii* have been recognised north of Australia or in any of the Pacific Islands. Both *S. erianthum* and *Physalis minima* were originally named from India and occur in the South East Asian tropics. Their dispersal to northern Australia by fruit pigeons or flying foxes from an early Spanish or Portuguese introduction from Central America is perhaps conceivable. I know of no confirmed records of early Portuguese/Spanish contacts with Queensland, but it is highly likely that they occurred.



Fig. 1. *Solanum shanesii* drawn from Clarkson 4585, 4586 and photos.

### Systematic treatment

*Solanum shanesii* F. Muell., *Fragm.* 6 (1868) 144.

*Type citation*: "Ad rivulos montium prope Rockhampton; Dallachy & O'shanesy."

*Lectotype*: MEL 12404, proposed Symon (1981b).

A tall shrub or small tree (4-) 6-7 (-8) m, trunk to 10-13 cm diam., branches brittle, bark with abundant lenticels, unarmed, indumentum of sparse simple, few celled hairs, slightly antrorse, apparently eglandular, concentrated at nodes, axils and young growth, glabrescent. *Leaves* (3.5-) 8 (-11) x (2.5-) 6 (-8) cm, ovate-acuminate, base rounded, oblique, extended in a narrow cuneate wing down petiole, often geminate, smaller leaf about 3/4 the size of larger, exposed leaves may have undulate margin and primary veins coloured purple; petiole (1-) 1.5 (-3) cm long. *Inflorescence* 1-2 (-3) pedicellate flowers from leaf axil in uppermost branches. *Flowers* of two kinds: apparently hermaphrodite, long-styled flowers which produce fruit and apparently male, short styled flowers which to not produce fruit. *Pedicel* c. 8 mm, gradually enlarged upwards. *Calyx* truncate with (4-) 5 short rounded lobes, acumens rarely developed. *Corolla* deeply stellate (4-) 5-partite, early flowers with a long style, late flowers with a short style (male), tube c. 2 mm long, lobes 7-8 mm long, elliptic, mid-portion relatively thick, margins (inter-acuminal tissue) narrow and slightly infolded, the whole strongly reflexed an anthesis, apex minutely papillose and distinctly inflexed, bluish-purple to deep purple with an almost brown mid-vein on ageing. *Filaments* c. 1.5 mm long, triangular in shape and broadly flattened towards base. *Anthers* 4-5 mm long, oblong, only slightly tapered, opening by apical pores, well exerted, erect in a cone, in male flowers the lower anther on a longer filament so that it exceeds others by 1-1.5 mm. *Ovary* c. 1.3 mm diam. ovoid, glabrous. *Style* of fruiting flowers c. 6 mm long, simple, erect, glabrous, exceeding anthers, stigmatic region attenuate, swollen and spindle shaped possibly bifid or partially so, male flowers with style 4 mm long, not exceeding anthers. *Fruiting pedicel* 2-3.5 cm long, distinctly enlarged distally; calyx patelliform. *Berry* 1-1.7 cm diam. nearly globular, bright shiny red. Seeds 3.5 mm diam., flattened, margin distinctly thickened, surface shallowly reticulate, buff coloured.

Chromosome number:  $n = 12$ , counted by P. Ellis from *Clarkson 4585*, voucher ADW.

#### *Distribution*

Queensland, Cape York. Common understorey element of deciduous or semideciduous closed forest pockets in the Byerstown Range area. Known also from several other locations on Cape York and from the Rockhampton area. The disjunction between the early collections from near Rockhampton and later collections much further north is inexplicable.

#### *Note*

Another collection belonging to section *Lycianthes*, *Heatwole s.n.*, 24.vii.1969, BRI has been found at Restoration Rock, near Cape Weymouth, 12° 38' Lat., 143° 26' Long., Qld. It appears to be different from *S. shanesii* and more material is required.

The species may be inserted into the key in Vol. 29 of 'Flora of Australia' as follows:

p. 76 rewrite lead 3 as follows—

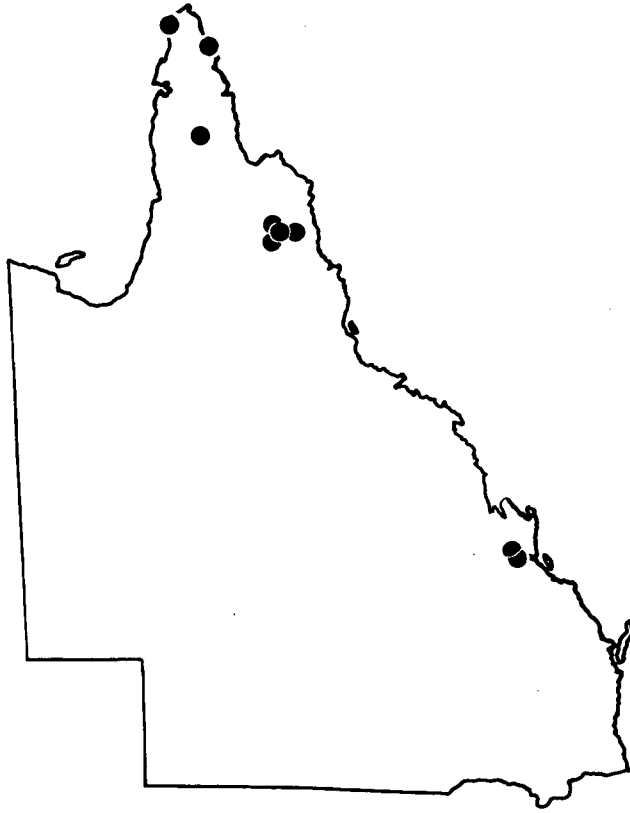
- 3 Inflorescence an axillary cluster of pedicellate flowers, peduncle absent or scarcely developed
- 3a Corolla rotate, leaves elliptic, ripe berry (rare) drab yellow-green . . . *S. rantonnei*
- 3a Corolla stellate, leaves ovate-acuminate, ripe berry bright red . . . . . *S. shanesii*

p. 77 rewrite lead 20 as follows—

20 Shrubs to 7 m

20a Flowers white, leaves lanceolate-elliptic, berry bright orange-red ..... *S. callium*

20a Flowers purple, leaves ovate-acuminate, berry bright red ..... *S. shanesii*



Map 1. Queensland: Distribution of *S. shanesii*.

*Specimens seen (all listed)*

QUEENSLAND: *Dallachy 435*, 17.iii.1863, Mores Creek (? near Rockhampton). Fruit red. K, MEL. *O'Shanesy 6*, 25.ii.1868, Rockhampton. Solanum erect and slender 6-8', bark light coloured and slightly blistered, berry shining red, 2-celled, not prickly. MEL. *O'Shanesy s.n.*, 1.ii.1969, Rockhampton. A deciduous shrub, flowers blue, petals reflexed, anthers yellow. MEL. *Done s.n.*, 3.vii.1969, Hannibal Island near Shelbourne Bay, 11° 35' Lat. 142° 56' Long. (Leaves only). BRI. *Hyland 5222*, 10.vi.1971, Great Divide, S of Byerstown, 16° 00' Lat. 144° 45' Long. 450 m alt. Monsoon forest, shrub of small tree, conspicuous elongated lenticels on the trunk. (Leaves only). QRS. *Nicholson AF04776*, 23.xi.1972; Rocky knob just S of divide on Palmer River road, 16° 00' Lat., 144° 00' Long. 460 m alt. Dry scrub. QRS. *Hyland 8713*, 6.iv.1976, Lankelly Creek road, 13° 54' Lat. 143° 15' Long. 450 m alt. Monsoon forest—rainforest, shrub 1-2 m tall. (Leaves only, doubtful). QRS. *Godwin C881*, v.1980, Byerstown Range, ca 1.5 ml E of Highway. 16° 00' Lat. 144° 50' Long. Deciduous vine thicket on iron-rich chert ridge along Fault Line. Understorey shrub. QRS. *Hyland 11071*, 26.v.1981, Mutee Head near Bamaga, 10° 55' Lat. 142° 15' Long. alt. 20 m. Rainforest, shrub 2-3 m tall. (Leaves only). QRS. *Clarkson 4217*, 23.xii.1981, 11.8 km north of the Palmer River on the Peninsula Development road. 16° 01' Lat. 144° 49' Long. 450 m alt. A shrub to 4 m tall. A fairly common understorey plant. (BRI, QRS, PERTH, NT, K, MO, L, MEL, n.v.). *Clarkson 4585*, 14.iii.1983, 11.7 km north of the Palmer River of Peninsula Development road. 16° 01' Lat. 144° 49' Long. 450 m alt. Small pocket of low closed forest on rocky hillside. Tall shrub or small tree to 6-7 m tall. ADW (BRI, QRS, K, L, F, US, CANB, AD, MO, PERTH, MEL, NSW, n.v.). *Clarkson 4586*, 14.iii.1983, 11.7 km north of the Palmer River on Peninsula Development road. 16° 01' Lat. 144° 49' Long. 450 m alt. Small pocket of closed forest on a rocky hillside. Small tree 6 m tall. On margin of forest. ADW, (BRI, QRS, K, L, n.v.). *Godwin C2416*, 7.vi.1983, Barrons Range, Kings Plain Station, SW of Cooktown. 15° 36.7' Lat. 145° 04.5' Long. 300 m alt. Semi evergreen mixed microphyll/notophyll vine forest on outcrop of limestone and metamorphic? rock adjacent to main limestone outcrop. 4 m shrub with crown at 1.5 m. QRS. *Clarkson 5131*, 31.i.1984, 11.7 km north of the Palmer River on Peninsula Development Road. 16° 01' Lat. 144° 49' Long. Closed forest pocket ADW (BRI, K, QRS, L, CANB, US, n.u.).

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**Bibliography**

- Bitter, G. (1920). Die Gattung *Lycianthes*. *Abh. Naturwiss. Vereine Bremen* 24: 292-520.  
 D'Arcy, W.G. (1973). Flora of Panama. Pt. IX Family 170, Solanaceae. *Ann. Missouri Bot. Gard.* 60: 573-780.  
 Deb, D.B. (1980). Enumeration, synonymy and distribution of the Solanaceae in India. *J. Econ. Tax. Bot.* 1: 33-54.  
 Gentry, J.L. & Standley, P.C. (1974). Flora of Guatemala X, Solanaceae. *Fieldiana: Botany*, 24: 1-151.  
 Haegi, L. (1976). Taxonomic account of *Datura L.* (Solanaceae) in Australia with a note on *Brugmansia Pers.* *Aust. J. Bot.* 24: 415-35.  
 Henderson, R.J.F. (1977) Notes on *Solanum* (Solanaceae) in Australia. *Austrobaileya* 1: 13-22.  
 Hunziker, A.T. (1979). South American Solanaceae: a synoptic survey. In: "The Biology and Taxonomy of the Solanaceae". Edit. J.G. Hawkes, R.N. Lester & A.D. Skelding. 49-85. (Academic Press: London).  
 MacBride, J.F. (1962). Flora of Peru, Solanaceae. *Field Mus. Nat. Hist. Bot. Ser.* 13(5): 1-267.  
 Morton, C.V. (1944). Taxonomic studies of tropical American plants. *Contr. U.S. Nat. Herb.* 29: 41-74.  
 Morton, C.V. (1976). A revision of the Argentine species of *Solanum*. *Acad. Nac. de Cienc. Cordoba.* 1-260.  
 Purdie, R.W., Symon, D.E. & Haegi, L. (1982). Solanaceae, 'Flora of Australia', Vol. 29. A.S. George, Editor. (Aust. Govt. Publ. Service: Canberra).  
 Ripperger, H., Schreiber, K., Symon, D. (1984). Soladulcidine from *Solanum shanestii*. *Pharmazie* 39: 125/.  
 Symon, D.E. (1981a). A revision of the genus *Solanum* in Australia. *J. Adelaide Bot. Gard.* 4: 1-367.  
 Symon, D.E. (1981b). The Solanaceae genera, *Browallia*, *Capsicum*, *Cestrum*, *Cyphomandra*, *Hyoscyamus*, *Lycopersicon*, *Nierembergia*, *Physalis*, *Petunia*, *Salpichroa* and *Withania*, naturalised in Australia. *J. Adelaide Bot. Gard.* 3: 133-166.