

Weber & Burt 1998d

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Beitr. Biol. Pflanzen 70: 225-273.

REFNO: 2947

KEYWORDS:

Borneo, Didissandra, Indonesia, Malaysia, *Ridleyandra*

Revision of the genus *Ridleyandra* (Gesneriaceae)

By A. WEBER* & B. L. BURTT**

* Institute of Botany, University of Vienna, Austria

** Royal Botanic Garden Edinburgh, Scotland, U. K.

(With 11 figures)

Keywords: Gesneriaceae, *Ridleyandra*, *Didissandra*. – Taxonomy, morphology. – Borneo, Malaya, Malaysia, Malesia, Indonesia.

Abstract

The genus *Ridleyandra*, established by WEBER & BURTT (1998a) for the species formerly placed in *Didissandra* sect. *Speciosae* Ridl. and *Didissandra* sect. *Stilpnothrix* C. B. Clarke, is revised. 23 species are recognized (the specific rank of some being still uncertain), 4 are described as new; two names are reduced to synonymy. 18 species, accommodated in sect. *Ridleyandra*, occur in the Malay Peninsula (3 of them in SE Thailand), 5 species (referred to sect. *Stilpnothrix*) in Borneo (incl. Natuna Islands).

Zusammenfassung

Die von WEBER & BURTT (1998a) aufgestellte Gattung *Ridleyandra* wird revidiert. Es werden 23 Arten unterschieden, wobei allerdings in einigen Fällen der Artrang noch unsicher ist. 4 Arten werden neu beschrieben. Auf der Malaiischen Halbinsel kommen 18 Arten (davon 3 in Süd-Thailand) vor. Sie können der Typussektion (sect. *Ridleyandra*) zugeordnet werden. Die 5 Arten aus Borneo (inkl. Natuna Inseln) gehören der Sektion *Stilpnothrix* an.

Introduction

The genus *Ridleyandra* was recently established for the accommodation of a number of species from the Malay Peninsula (including southernmost Thailand) and Borneo that had been placed hitherto in *Didissandra* sect. *Speciosae* Ridl. and sect. *Stilpnothrix* C. B. Clarke (WEBER & BURTT 1998a). The genus *Didissandra*, to which in the course of time over 80 species distributed from China to Java have been referred, proved to

consist of completely unrelated alliances (just having the tetrandrous and didynamous androecium in common) and emerged from the examination as a small genus of 8 species restricted to West Malesia.

Characteristic features of *Ridleyandra* are: (a) the habit: leaves in a tuft or rosette on top of a mostly erect, woody stem, (b) a (short to long) corolla with four stamens, (c) an orthocarpic fruit, opening along the upper side and (d) seeds with a single, thick longitudinal ridge on each testa cell. All species are forest plants usually restricted to primary forest on acid soil.

Notes on characters

Habit: The species are usually woody plants with a short to long ascending-erect, mostly unbranched stem bearing the leaves at the top. The leaves are mostly arranged in a \pm compact tuft or rosette, rarely there are well developed internodes between them (*R. porphyrantha*, *R. tenella*). Phyllotaxis is decussate, but this is rarely evident, as the leaves are often arranged in a dense rosette. Leaf form is remarkably variable. In a number of species the leaves are entire, but more frequently they are dentate, serrate, or – unlike other Gesneriaceae – deeply saw-toothed or shallowly lobed (Fig. 1, 2).

Indumentum: This consists of two types of hairs: (a) \pm long, uniseriate, eglandular hairs; these often densely cover the stem and – more loosely – the leaves, especially on the lower surface. The upper side of the leaves is often glabrous. If hairs are present, then the lamina may be slightly strongly mamillate above; each mamilla, corresponding to an invagination on the lower surface, bears a hair at the top (particularly conspicuous in *R. atrocyanea*). Of the Bornean species, *R. tenella* is weakly mamillate; *R. natunae* is nearly glabrous above, but *R. ornata*, *R. synaptica* and *R. rufa* have setose hairs on the upper surface without any sign of mamillae. (b) Minute, sessile glands; these are present in most (all?) species, but are often difficult to detect, even under the stereo-microscope, as they are usually already collapsed on the mature leaves. At least in *R. porphyrantha*, *R. atrocyanea*, *R. quercifolia* and *R. castaneifolia* they consist of two cells (see WEBER & BURTT 1998a, Fig. 1). It is remarkable that glandular hairs of the ordinary type (with a several-celled stalk and a glandular head) are completely absent from the vegetative parts.

Inflorescence: As usual, the inflorescences are axillary, with a pair-flowered cyme at the top of a \pm long peduncle. The flower number is usually low and often regularly reduced to one (e.g., *R. atrocyanea*, *R. ornata*). Bracts are always present, mostly small and linear, more rarely

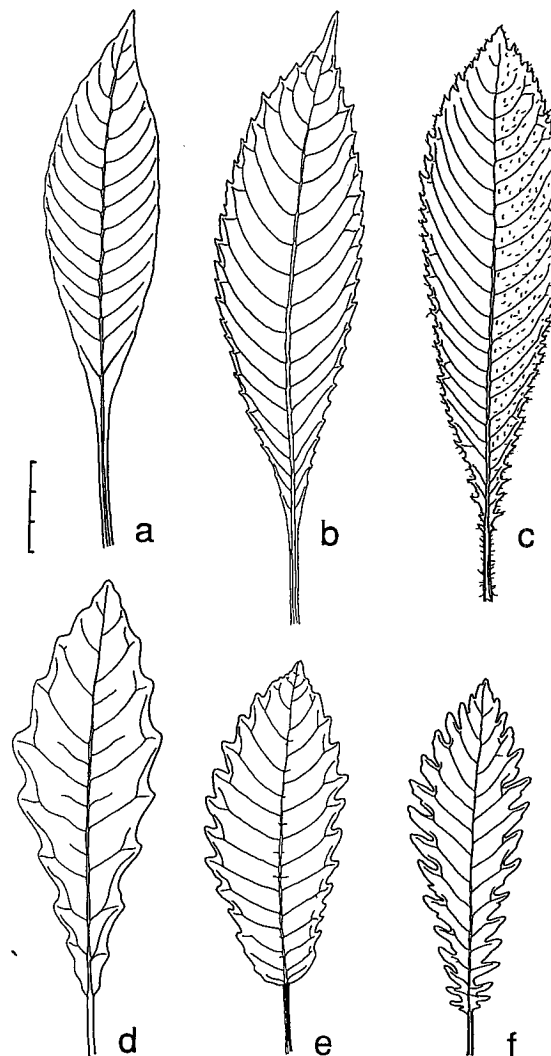


Fig. 1. Leaves of *Ridleyandra* species (sect. *Ridleyandra*); a *R. stellata* (WEBER 870520-1/3, WU), b *R. porphyrantha* (WEBER 870520-1/12, WU), c *R. longisepala* (WEBER 870622-3/9, WU), d *R. quercifolia* (SINCLAIR & KIAH 38656, SING), e *R. castaneifolia* (KIAH 31769, SING), f *R. morgani* (WEBER 870624-1/3, WU). Bar: 3 cm.

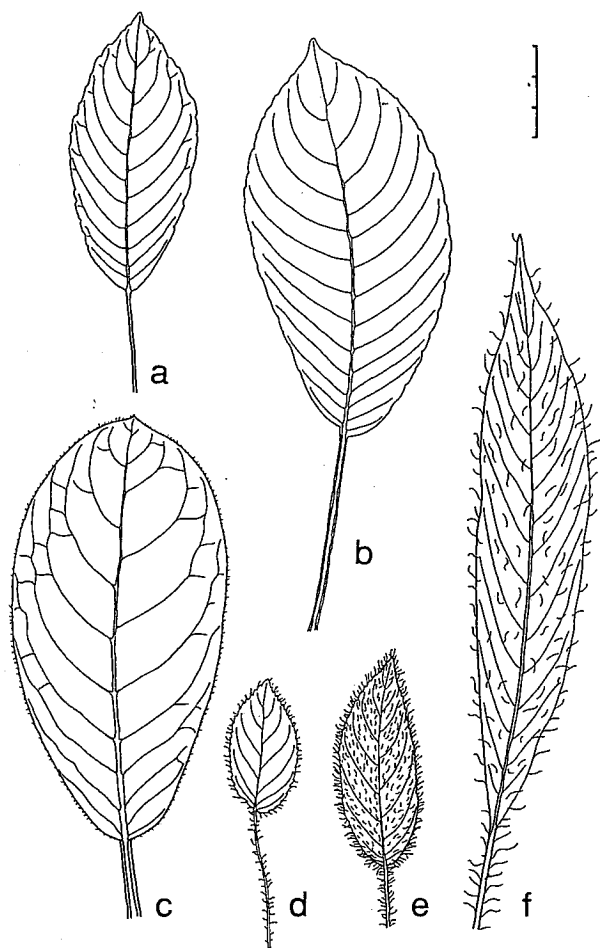


Fig. 2. Leaves of *Ridleyandra* species (a - c sect. *Ridleyandra*, d - f sect. *Stilpnotherix*); a, b *R. petiolata* (F. M. S. Museum 6.1917, K), c *R. flammea* (PHENGLAI & SMITINAND 1180, K), d *R. tenella* (CLEMENS 30732, BM), e *R. rufa* (WINKLER 274, E), f *R. ornata* (BROOKE 9499, L). Bar: 3 cm.

fairly large and broadly lanceolate. In *R. wrayi* the broad bracts are placed immediately below the sepals and enclose the calyx as a kind of involucre.

Flowers and pollination: The five sepals are usually free to the base, only in *R. porphyrantha* (and *R. corneri*?) are they connate in the lower part. With the exception of *R. kerrii*, in which the very narrow sepals equal the rather short-tubed corolla in length, the sepals are much shorter than the corolla.

In most Malayan species the corolla has a very distinctive shape: there is a short narrow cylindrical portion at the base, then the tube widens very distinctly. Above that, the tube continues to widen, but this is very gradual. The corolla lobes are rather short and rounded. Coloration is variable: lemon yellow, white (with a pink or violet tinge, or streaked with violet lines), blue, mauve, violet. In a number of species (*R. atrocyanea*, *R. porphyrantha*, *R. corneri*, most probably also *R. atropurpurea*) the limb is extremely dark coloured, appearing nearly black. In *R. morgani* and *R. porphyrantha* whitish lines run from the mouth into the tube interior. A reverse coloration is found in *R. wrayi* and *R. stellata*: here the corolla is of a dirty white colour, and dark purple lines run from the lobes into the tube.

In the long-tubed flowers the four stamens are completely included in the corolla. They have long filaments, which are somewhat flattened and curved in the middle part, and are didynamous. The anthers cohere in pairs at their apex. The connective produces in most (all?) species a distinct horn-shaped outgrowth.

In the Malayan species a disc (cup-shaped, sometimes shallowly lobed) is present and the flowers can be classified as nectar-flowers.

Regarding the pistil, the stigma shape is notable. Where known (observations refer only to some Malayan species) it is a flat, broadly triangular lip, formed only by the lower carpel. It is very large in *R. stellata*, filling nearly the whole mouth of the corolla.

No observations on pollination have been reported so far, but there is little doubt that the flowers are insect- (bee-)pollinated. Still enigmatic is the extremely dark (blackish) coloration of the flower entrance in the species around *R. atrocyanea*. The idea that the dark floral tube may mimic a sleeping hole (to some degree comparable to the orchids *Serapias vomeracea*, DAFNI & al. 1981, and *Ophrys helenae*, PAULUS & GACK 1993) is in conflict with the fact that the flowers possess a nectary and are apparently nectar-flowers.

In the Bornean species there is a gradation from a fairly long corolla-tube (*R. synaptica*) through *R. tenella* to the campanulate *R. natunae* and

R. ornata, finally reaching the nearly flat ('saintpaulioid') corolla of *R. rufa*; but this series is not to be read as a direct phyletic line.

The arrangement of the anthers changes with the change in tube length. In *R. synaptica* (tube 20 mm) and *R. tenella* (tube 10 mm) the stamens are wholly included and strictly didynamous, the anthers being joined in pairs at different levels in the tube. In *R. natunae* and *R. ornata* the corolla is \pm campanulate, the tube only 6 mm; the filaments are straight and the anthers are either in two pairs very close together (*R. natunae*) or all four are united by their tips just within the corolla mouth (*R. ornata*). In *R. rufa* the corolla tube is very short (3 mm) and is virtually hidden by the limb which spreads at right-angles to it; all four anthers are joined at their tips and are exposed at the corolla-mouth, but here the anthers of the longer pair of stamens are brought back to the level of those of the shorter pair by a kink in the filaments. In view of the extremely close vegetative resemblances between *R. synaptica* and *R. rufa* one is tempted to suggest that there has been a fairly direct change from the long-tubed *synaptica*-type corolla to the short-tubed *rufa*-type, necessitating the looping of the longer filaments in *R. rufa* in order to bring the four anthers together. On the other hand the union of all four anthers in *R. natunae* and *R. ornata* seems to have been brought about by an equalization of filament lengths.

It will be noticed that the change from a long-tubed flower with included anthers to a short-tubed one with exposed anthers has been accompanied by a considerable increase in the size of the anthers. In *R. tenella* they measure about 0,5 x 1 mm and the thecae are fully divaricate; in *R. natunae*, *R. ornata* and *R. rufa* they are 2 - 2,5 x 1,5 - 2 mm, more or less sagittate, the thecae only slightly divergent at the base. This suggests that in anthecological terms there has been a change from nectar-flowers to pollen flowers. Corroborative evidence is given by the reduction of the disc. In *R. tenella* it is distinct although rather small; in *R. natunae* it is 0,75 mm high but is very thin and is possibly not functional; in *R. ornata* and *R. rufa* the disc is obsolete. *R. rufa* apparently has pollen deceptive flowers of the *Saintpaulia*-type.

It is worth noting that all the Bornean species have white or white suffused with mauve or mauve to violet corollas: field notes give no indication of any form of striping or of yellow lines. Furthermore all have anthers that lack the outgrowths on the connective so commonly found in the Malayan species.

Fruits: The fruit of *Ridleyandra* is superficially similar to that of 'Malalesian *Didymocarpus*' (*Henckelia*, cf. WEBER & BURTT 1998b): it is an elongate capsule opening along the upper side. There are, however, some

important differences: (1) the capsule is orthocarpic, meaning that it is held \pm in direct continuation of the pedicel. The horizontal position is attained by (a) the upper part of the pedicel being curved, and/or (b) (in the Malayan species) by curvature of the tapering fruit base. In 'Malalesian *Didymocarpus*' it is the receptacle itself which by unequal growth brings the capsule into a horizontal position. (2) At least in the Malayan species the fruit wall is comparatively thick and \pm fleshy. As far as known, the fruit of the Bornean species is rather dry. (3) Especially when much elongated, the fruit is often curved, with the apex sometimes pointing fairly sharply downwards.

The anatomy of the fruit has been studied in some detail in *R. porphyrantha* (WEBER & BURTT 1998a). The sections through the open fruit show the thick pericarpium, consisting of several cell layers. The placentae are comparatively small. It is remarkable that there are no endocarpic cell layers with thickened cell walls. On the contrary, the inner cells are increased in size. The vascular bundles have no sclerenchyma sheaths on the outer side. Such sclerenchyma sheaths are present in the Bornean *R. ornata*. Here the median bundle of the lower carpel is pinnately branched and the network of vascular bundles can be easily removed from the pericarpium. In this (and perhaps also in other Bornean) species brachysclereids are found in the ground tissue and in the placentae (BOKHARI in litt.).

The horizontal position and follicular dehiscence of the fruits allow the seeds to be easily washed out by rain. Functionally, the fruit can thus be classified as a rain-splash capsule. Its length varies from species to species and there seems to be an evolutionary trend to shortening the capsule. Long fruits are found, e.g., in *R. porphyrantha*, *R. atrocyanea* and *R. quercifolia* (6 - 9cm), short ones in *R. latisejala*, *R. stellata* and *R. ornata* (1 - 1,5cm), most of the remaining species lying in between.

Pollen: The pollen of some Malayan species (*R. morganii*, *R. porphyrantha*, *R. quercifolia*, *R. stellata*) has been studied by LUEGMAYR (1989, 1993). The grains are spheroidal, semiangular to circular in polar view, circular in equatorial view, and tricolp(or)ate. In the first three species the tectum is reticulate, with smooth muri. Between the species there are differences in the measurements of the reticulum lumina. *R. stellata* differs in (a) having a fragmented reticulum, and (b) by the presence of spinulae on the muri.

Seeds: The seeds of *Ridleyandra* are of the usual small size, ellipsoidal-polygonal in shape and brown or blackish-brown colour. As emerged from an SEM-study (SONTAG & WEBER 1998) the seeds have a unique and easily recognizable surface structure: the surface cells are elongate (in

axial direction) and each cell bears a prominent ridge. The ridges thus show equal and parallel orientation. This pattern is found in the Malayan as well as in the Bornean species and is taken as the most important indication that the Malayan and Bornean species are congeneric. It has not yet been found in other genera. There is but one exception: *R. tenella*. This Bornean species has half-moon-shaped thickenings at the cell edges. This feature as well as the dwarf creeping habit, makes it questionable if the species is correctly placed in *Ridleyandra*.

Chromosome number: So far, only the chromosome number of some Malayan species are known (see Table 1). The base number is obviously $n = 17$. This number is found neither in *Didissandra* (*D. frutescens*: $n = 10$) nor in 'Malesian *Didymocarpus*' (most species $n = 9$, a few being tetraploid with $n = 18$). The only Malayan genus in which $n = 17$ recurs is *Cyrtandra*.

Table 1
Chromosome numbers in *Ridleyandra*
(summarized from KIEHN & al. 1998).

	n	2n
<i>R. atrocyanea</i>		32 - 34
<i>R. longisepala</i>		34
<i>R. morganii</i>	17	32 - 34
<i>R. stellata</i>	17	
<i>R. porphyrantha</i>		c. 34
<i>R. quercifolia</i>	17	34

Species number and distribution

In the present revision 23 species are recognized (the specific rank of some being, however, doubtful). 18 occur in the Malay Peninsula (including southernmost Thailand), 5 in Borneo (including Natuna Islands).

Ecology

Ridleyandra is essentially a genus of primary montane rain forest. Most species occur at higher altitudes, some (e.g., *R. atrocyanea*, *R. tenella*) even in moss forest. Only few (e.g., *R. corneri*) are found in the lowlands and are apparently confined to localities with very high rainfall.

Inter- and infrageneric affinities

Affinities of the genus. The affinity of *Ridleyandra* is still obscure. There is certainly no close affinity to *Didissandra*, to which genus the species had been formerly referred (for details see WEBER & BURTT 1998a).

RIDLEY (1905: 5) was apparently well aware of the problematic position of the "very distinct section *Speciosae*" in *Didissandra*. He pointed out that "in some respects ... they approach the section *Heteroboaea* of *Didymocarpus*, and one ... plant, *Didymocarpus venustus*, possesses all the characteristics of this group of *Didissandra*, except that it has but two stamens". RIDLEY's assessment, however, is not tenable in several respects: (a) *Ridleyandra* has certainly nothing to do with sect. *Heteroboaea* of *Didymocarpus* (with *D. platypus* and *D. crinitus* as the most representative species), or with the other Malesian species of *Didymocarpus* (*Henckelia*, WEBER & BURTT 1998b) in general: the similarity in the fruits (plagiocarpic capsule opening along the upper suture) is only superficial and has apparently originated independently in the two genera in adopting rain splash dispersal; also the chromosome numbers give no indication of a closer affinity. (b) *D. venustus* is not a member of sect. *Heteroboaea* (to which RIDLEY 1905 and 1909 referred it; RIDLEY himself transferred it to section *Didymanthus* (a much better place!) in 1923; (c) when saying that "such plants as *D. ornata* of Borneo are more nearly allied to *Boea* or *Paraboaea* [to which RIDLEY also referred the short-tubed species of *Didymocarpus*]", RIDLEY relied wholly on the short/campanulate corolla and did not realize (even explicitly denied) the relationship with the Malayan "*Speciosae*". He would have recognized sect. *Stilpnothrix* as a distinct genus, as is shown by the cover written up in his hand in the Kew herbarium.

The possibility of a somewhat closer relationship with *Cyrtandra* (tribe *Cyrtandreae*) is at the moment completely speculative, but perhaps worth mentioning. One hint is the same and otherwise rare chromosome number $n = 17$ (see above), another the somewhat fleshy consistence of the fruit, found, at least, in the Malayan species. In principle it is conceivable that progressive development of this may have led to an indehiscent fruit of the *Cyrtandra*-type.

Subdivision of the genus. The Malayan species seem to form a fairly compact group. This is rather less evident in the Bornean species, which - despite the low species number - seem to be more diverse. Here a wide morphological range is to be observed particularly of the corolla form; a general trend may be seen in the progressive shortening of the corolla and the reduction of the disc in connection with a change from nectar- to pollen-flowers.

In view of the morphological and geographical break, the Malayan and the Bornean species are distributed to two sections, sect. *Ridleyandra* (= RIDLEY's sect. *Speciosae*) and CLARKE's sect. *Stilpnothrix* of *Didissandra*, which is here transferred to *Ridleyandra*.

Species concept. The species concept adopted here is rather narrow, following the traditional treatment of larger Malesian genera such as *Didymocarpus* / *Loxocarpus* / *Henckelia* (see comments in WEBER & BURTT 1998b, Appendix III). The authors, however, are well aware that some of the Malayan species of *Ridleyandra* represent little more than local 'microspecies' (subspecies? varieties?) of somewhat disjunct distribution. Thus, in a more generous species concept, *R. glabrescens* and *R. kiewii* could be referred to *R. atrocyanea*, *R. corneri* to *R. porphyrantha*, *R. longisepala* to *R. serratifolia* and *R. stellata* to *R. violacea* as infraspecific taxa. However, in all these cases at least one member of these groups is only badly known and requires more and better collections before a definite decision about the taxonomic rank can be made. At the present state of insufficient knowledge it seems best to treat all recognizable taxa at the same (that is specific) level and to renounce a more complex hierarchy.

Putative affinities within the Malayan species. Though on the one hand some species can be safely related to one another or grouped into pairs, a well-founded picture of the overall affinities cannot be presented. There are two essential problems: (a) It is by no means clear which species or species groups are the primitive ones, (b) floral details of several species are still insufficiently known.

The following arrangement must be considered as a first and very provisional attempt:

- R. atrocyanea* – *R. glabrescens* – *R. kiewii*
- R. corneri* – *R. porphyrantha*
- R. atropurpurea* – *R. petiolata*
-
- R. flammea*
-
- R. latisepala*
-
- R. serratifolia* – *R. longisepala*
-
- R. wrayi* – *R. violacea* – *R. stellata*
-
- R. morganii*
- R. kerrii*
- R. castaneifolia* – *R. quercifolia*

R. atrocyanea, *R. glabrescens*, *R. kiewii*, *R. porphyrantha* and *R. corneri* have very characteristic and strange flowers with a violet tube and a very dark (nearly black) limb and thus certainly can be regarded as closely related. The alliance can be split in two pairs: *R. atrocyanea* and *R. kiewii* have bullate-mamillate leaves and can be placed close together. *R. glabrescens* seems to be little more than a glabrous form of *R. atrocyanea* and may be conspecific. *R. porphyrantha* and *R. corneri* have very similar lanceolate-falcate leaves with dentate margin and are obviously closely allied. Unfortunately, the flower coloration of *R. petiolata* and *atropurpurea* is not known in much detail. That of *R. atropurpurea* is described as deep purple and may come close to the former species. Both species have long-petioled leaves with an entire margin. The two are certainly closely allied, but the connexion with the former ones is not as clear.

R. flammea seems to stand quite on its own with its thick blunt leaves and the glandular-pubescent ovary and fruit. The same applies to the poorly known *R. latisepala* which has crenate-dentate leaves, also with a distinct petiole.

R. serratifolia and *R. longisepala* are very close and even may be conspecific. This pair seems to be more closely related to *R. wrayi*, having the bracts very close to the calyx. Also the corolla colour (white, violet streaks) is similar in *R. wrayi* and *R. longisepala*. On grounds of the similarity in habit *R. wrayi* may also be related to *R. violacea*, which on the other hand is very close to the newly described *R. stellata*.

The *R. morganii*-group is characterized by deeply saw-toothed leaves, that change into wavy lobes in *R. quercifolia*. The latter species and *R. castaneifolia* have yellow flowers and may be the more closely related ones. The leaf serrature of *R. castaneifolia* and *R. kerrii* is very similar and this may be another line of alliance. *R. morganii* has mauve flowers with whitish streaks in the mouth. In the nearly campanulate flowers with narrow sepals ± equalling the corolla *R. kerrii* has rather exceptional features.

The Bornean species. As was already said above, a common feature seems to be the gradual reduction of a disc. This indicates, that the Bornean species have changed from nectar- to pollen-flowers. In this connection also the progressive shortening of the corolla can be understood. Thus the species with a long corolla tube can be regarded as the more primitive ones and *R. rufa* with its saintpaulioid flower marks the most derived state.

Taxonomic treatment

Ridleyandra A. Weber & B. L. Burtt, Beitr. Biol. Pflanzen 70: 171 (1998).

Generic description: Herbs with a woody stem (except *R. tenella*). Stem short or elongate, ± erect, often hairy, the leaves usually in a dense rosette or loose tuft on top. Leaves petiolate, lamina obovate, elliptical, or lanceolate; margin entire, dentate, serrate, deeply saw-toothed or wavy; often glabrous on upper side, but (always?) with minute sessile, 2-celled glands. Peduncles axillary, elongate, with 2 broad-lanceolate to linear bracts. Flowers several (pair-flowered cyme) or one. Sepals 5, free to base. Corolla long & rather broad-tubed or campanulate or very short-tubed with nearly flat limb, limb bilabiate, lobes rounded. Stamens 4, didynamous, filaments long or (in the short-tubed species) short. Anthers cohering in pairs at the apex, occasionally all four coherent by the tips, sometimes with spur-like outgrowths. Disc cup-shaped or a low ring or lacking. Ovary ovoid to elongate, usually glabrous; stigma (always?) formed by the lower carpel. Fruit capsular, elongate or short, wall thick, ± fleshy or dry, dehiscent on the upper side. Seeds numerous, small, elliptical, testa cells with a longitudinal ridge in the middle (except *R. tenella*).

The sections

1) *Ridleyandra* sect. *Ridleyandra*

≡ *Didissandra* sect. *Speciosae* Ridl., J. Straits Br. Roy. Asiat. Soc. 44: 2, 20 (1905); B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 21: 197 (1954).

Type species (lecto WEBER & BURTT 1998a): *Ridleyandra atrocyanea* (Ridl.) A. Weber

2) *Ridleyandra* sect. *Stilpnothrix* (C. B. Clarke) A. Weber & B. L. Burtt

≡ *Didissandra* sect. *Stilpnothrix* C. B. Clarke, in A. & C. DC., Monogr. phan. 5/1: 69 (1883); B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 21: 197 (1954); B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 31: 40 (1971).

Type species (lecto BURTT 1954): *Ridleyandra ornata* (C. B. Clarke) B. L. Burtt

Key to the species

- 1 Corolla usually exceeding 3 cm, if shorter ovary always glabrous; cup-shaped disc present (sect. *Ridleyandra*)

2

- 2 Leaves entire or indistinctly crenulate-undulate 3
- 3 Leaves oblanceolate, broadest in the upper third, base very gradually tapering; flowers solitary on peduncle 4
- 4 Bracts broadly triangular to suborbicular, placed immediately below the calyx and enclosing it 16. *R. wrayi*
- 4* Bracts lanceolate or linear, placed distinctly below the calyx 5
- 5 Corolla large, to 4,5 cm long, violet; fruit 4,5 cm long 17. *R. violacea*
- 5* Corolla small, to 1,5 cm long, white, suffused pink; fruit 1 cm long 18. *R. stellata*
- 3* Leaves obovate, ovate or elliptical, base cuneate or rounded; usually more than 1 flower on peduncle 6
- 6 Petiole half to nearly as long as lamina; peduncle as long as or longer than subtending leaf 7. *R. petiolata*
- 6* Petiole less than half as long as lamina; peduncle shorter than subtending leaf 7
- 7 Peduncle and sepals (sub)glabrous, sepals c. 7 mm long; lamina elliptic to obovate, apex acute or blunt; corolla purple; ovary glabrous 6. *R. atropurpurea*
- 7* Peduncle and sepals densely hairy, sepals c. 15 mm long; lamina obovate to obovate-oblong, apex broadly rounded; corolla orange-red; ovary glandular-pubescent 8. *R. flammea*
- 2* Leaf margin crenate, dentate, serrate or deeply lobed 8
- 8 Lamina base cordate; margin crenate-undulate; petiole more than half as long as lamina; lamina (in vivo) strongly bullate-mamillate, with a hair on each peak; corolla violet, with a nearly black limb 3. *R. kiewii*
- 8* Lamina base cuneate or attenuate; petiole less than half as long as lamina 9

- 9 Fruit less than 1 cm, fusiform; leaves elliptic, apex acute-acuminate, base cuneate, margin rather finely and bluntly serrate
9. *R. latisejala* 10
- 9* Fruit much longer; leaves (ob)lanceolate (to elliptic)
10
- 10 Leaf margin dentate-crenate, teeth 1 - 2 mm long, (5-) 10 (-15) mm apart
11
- 11 Leaves in a very dense rosette on top of a stout, woody stem
5. *R. corneri*
- 11* Leaves in distinct pairs, c. 2 cm apart
4. *R. porphyrantha*
- 10* Leaf margin not so
12
- 12 Margin serrate, teeth close together
13
- 13 Teeth 2 - 3 mm long, \pm pointed
14
- 14 Bracts lanceolate-linear, placed 1 - 3 cm below the calyx; sepals to 4 mm long, subglabrous; flower violet, limb black
15
- 15 Leaf surface bullate-mamillate, with a long hair at each peak
1. *R. atrocyanea*
- 15* Leaf surface \pm smooth, subglabrous
2. *R. glabrescens*
- 14* Bracts elliptical, placed immediately below the calyx, with long red-brown hairs; sepals to 15 mm long, toothed, with long red-brown hairs
16
- 16 Corolla violet
14. *R. serratifolia*
- 16* Corolla dirty white, with fine violet streaks
15. *R. longisejala*
- 13* Teeth coarse, at least 5 mm long
17
- 17 Teeth often with side teeth, usually blunt; corolla blue-mauve
10. *R. morganii*

- 17* Teeth simple, \pm pointed
18
- 18 Lamina base cuneate; sepals much shorter than the corolla; corolla yellow
12. *R. castaneifolia*
- 18 Lamina base decurrent; sepals long, narrow, as long as the corolla; corolla white, lobes suffused violet
11. *R. kerrii*
- 12* Leaves with broad wavy lobes, corolla yellow
13. *R. quercifolia*
- 1* Corolla up to 3 cm long, the ovary always pubescent; disc reduced to a low ring or lacking (sect. *Stilpnothrix*)
19
- 19 Corolla tubular, tube 10 - 20 mm
20
- 20 Plant weak-stemmed, creeping and rooting; leaves weakly mamillate; peduncles single-flowered, not or scarcely exceeding leaves; pedicels not more than 5 mm long; corolla tube c. 10 mm
19. *R. tenella*
- 20* Plant rosulate; leaves not mamillate; peduncles 2-flowered, distinctly overtopping the leaves; pedicels 20 mm or more; corolla tube 20 mm
20. *R. synaptica*
- 19* Corolla tube 3 - 6 mm long
21
- 21 Corolla campanulate, tube c. 6 mm long; leaf margin (sub)entire
22
- 22 Leaves lanceolate (some slightly falcate), (10-) 15 - 25 cm long, with long pale hairs; peduncle about half as long as the subtending leaf, bearing a single flower
22. *R. ornata*
- 22* Leaves elliptical, 5 - 6 cm long; peduncle twice as long as subtending leaf, bearing 1 - 3 flowers
21. *R. natunae*
- 21* Corolla with flat limb, 3 lower lobes longer than upper, cruciately arranged, tube c. 3mm; leaves narrow-ovate, with long rufous hairs, margin crenate-serrate
23. *R. rufa*

Sect. *Ridleyandra*

1. *Ridleyandra atrocyanea* (Ridl.) A. Weber, Beitr. Biol. Pflanzen 70: 171 (1998)

≡ *Didissandra atrocyanea* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 26 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 741 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 951 (1909); Ridl., Fl. Malay Penins. 2: 503 (1923).

Lectotype (chosen here): Perak; Bujang Melaka, 2 - 3000 ft.; VIII. 1898, CURTIS 3298 (SING, 3 iso SING).

Etymology: *atrocyaneus* = dark blue, referring to the corolla colour.

Description: Stem woody, base decumbent and rooting, ascending part several cm long. Leaves in a rosette at top of stem, petiole 0.5 - 2 cm long; lamina 10 - 15 x 3 - 5 cm; (ob)lanceolate-oblong, base attenuate, sometimes somewhat inaequalateral, apex acute, margin strongly serrate; surface strongly mamillate, at the tip of each mamilla a setose hair, otherwise glabrous; colour (in vivo) dark purplish green, pale green on underside. Peduncle 8 - 12 cm, sparsely hairy, with 2 small, linear bracts c. 1 cm below the solitary flower. Sepals oblong, c. 7 mm long, glabrescent or sparsely hairy. Corolla c. 5 cm long, deep violet with an almost black mouth; tube shortly narrowed at base, broadly cylindrical above pubescent outside; lobes short, rounded. Stamens 4; filaments slender, anthers cohering by pairs. Capsule glabrous, cylindrical, curved, 5 - 7 cm long.

Illustration: Fig. 3 [habit], SONTAG & WEBER 1998: Fig. 3e [seed].

Distribution: Peninsular Malaysia. Perak: Gunung Bujang Melaka.

Ecology: In primary montane forest, especially moss forest at and below ridges and the top area.

Chromosome number: $2n = 32 - 34$ (KIEHN & al. 1998).

Notes: *Ridleyandra atrocyanea* is one of the curious species with a dark purple-violet flower, the limb being nearly black (see the introductory notes). Apart from *R. glabrescens* (which may even be conspecific) the species is apparently closely related to *R. porphyrantha*, *R. corneri* and (perhaps) *R. atropurpurea*, all having flowers of similar size, form and coloration.

The plant is also very conspicuous in its vegetative parts: the leaves are of a dark purplish-green colour and conspicuously bullate-mamillate, with a single long hair placed on the top of each mamilla. This feature, however, is subject to variation: the leaves of plants growing at

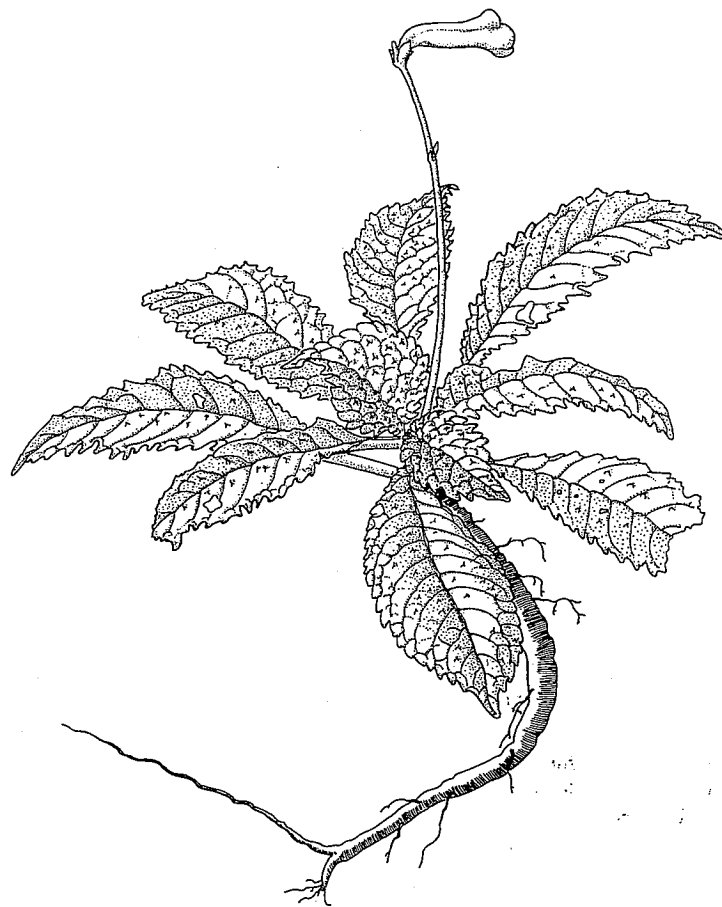


Fig. 3. *R. atrocyanea*, Peninsular Malaysia, Perak, Gunung Bujang Melaka (drawing by D. HADL after a photo of A. W.).

lower altitude (that means below the zone of moss forest) and juvenile plants are less hairy to glabrous, and then they do not show the mamillate condition.

Specimens: CURTIS 3298 (SING, lectotype). - KING's coll. [Kunstler] 7191 (K, SING; syntype of *Didissandra glabrescens*¹). - RIDLEY s.n., IX 1898 (SING, syntype). - SCORTECHINI 189b (SING). - SCORTECHINI 368b (K, SING). - SHAH & SHUKOR MS 3390 (KEP, KLU, MO, SING). - SCORTECHINI 368b (SING; syntype). - WEBER & ANTHONYSAMY 870520-1/12 (WU).

2. *Ridleyandra glabrescens* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra glabrescens* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 24 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 744 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gampet.) no. 21: 954 (1909); Ridl., Fl. Malay Penins. 2: 505 (1923).

Lectotype (chosen here): Perak, Gunung Batu Puteh, 2000 - 3000 ft.; VIII. 1885, KING's coll. [Kunstler] 8055 (SING).

Etymology: glabrescens = becoming glabrous; referring to the leaves.

Description: Like *R. atrocyanea*, but leaves ± without hairs and without mamillae.

Distribution: Peninsular Malaysia. Perak: Gunung Batu Puteh, 700 - 1000m, 2200 m.

Ecology: In primary montane forest.

Chromosome number: Unknown.

Notes: It is most probable that *Ridleyandra glabrescens* is not more than a glabrous form of *R. atrocyanea* and does not merit specific status. It was noted under that species, that the presence of setae on the leaves (which cause the conspicuous bullate-mamillate appearance) depends on the age of the plant and on the growing conditions. But before reducing the species to synonymy or giving it an infraspecific rank, the plant should be re-collected at the type locality (G. Batu Puteh) in order to see if the glabrous leaves are a constant feature.

The plant is so far known only from the 3 syntypes: two collected on G. Batu Puteh, one on 'G. M.'². The latter (KING's coll. 7191) is referred here to *R. atrocyanea*: the leaves have two lines of hairs (with a single hair in each intercosta) and definitely belongs to that species.

¹ See notes under *R. glabrescens*.

² RIDLEY referred in 1905 and 1909 to the locality only as 'Kinta', and in 1923 as 'Kinta, Gunung Megua'; 'G. M.', however, certainly means Gunung [Bujang] Melaka (see NARAYANASWAMI 1931: 329), on which mountain *R. atrocyanea* is found.

Specimens: KING's coll. [KUNSTLER] 8055 (SING; lectotype). - WRAY jr. 384 (SING; syntype).

3. *Ridleyandra kiewii* (Kiew) A. Weber, comb. nov.

≡ *Didissandra kiewii* Kiew, Malayan Nature J. 41: 212 (1989).

Type: Johore, Selai Valley, KIEW B. H. SB 35 (holo UPM).

Etymology: the epithet honours KIEW B.H., herpetologist at the University of Malaya and husband of R. KIEW, who described the species. He was the first to collect the plant.

Description: (slightly shortened and modified after KIEW 1989): Stem woody, unbranched, to 15 cm long. Petiole 6 - 9 cm long, densely hispid; lamina broadly elliptic to oblong, 10 - 18 x 6 - 9 cm; base cordate, apex broadly acute, margin crenate-undulate, surface (in vivo) mamillate, each peak rising with a single fine hair 4 - 6 mm long; shining, dark green above, in some plants variegated with a broad light green stripe down margin or reddish below with a light green band on midrib. Veins c. 9 pairs. Peduncle 9 - 18 cm long, densely hispid, bearing 1 - 3 flowers. Bracts 2, narrowly lanceolate, 12 - 15 x 1 - 1.5 mm, hispid. Pedicel 4 - 5 mm long, hispid. Sepals 10 x 3 mm long, hispid particularly at base. Corolla trumpet-shaped, 3.5 - 4 cm long, 1 - 1.5 cm wide at the mouth; deep purple red outside, black inside. Stamens 4, didynamous, filaments slender, anthers connivent, reniform, pale yellow. Ovary 20 x 1 mm, glabrous, surrounded at base by a fleshy nectary, narrowing to a spatulate stigma 3 mm long. Capsule 5 - 5.5 cm long, dark red, curved downwards at apex, splitting along the upper surface.

Illustrations: Front cover of 'The Malayan Naturalist' 40/2 (1986).

Distribution: Peninsular Malaysia. Johore: Endau-Rompin area, Selai valley, 170 and 400 m.

Ecology: In mixed dipterocarp forest; ground herb.

Chromosome number: Unknown.

Notes: The species is one of the fine discoveries of the Endau-Rompin Expedition conducted in 1985/86 by Dr. KIEW B. H. The strongly bullate-mamillate leaves (similar to those in *R. atrocyanea*) are made most attractive by their dark purple colour with a broad light green band along the margin. The flower is deep violet, with nearly black lobes and interior of tube.

Specimens: KIEW B. H. SB 21 (KEP). - KIEW B. H. SB 27 (KEP). - KIEW B. H. SB 35 (KEP, type).

4. *Ridleyandra porphyrantha* (A. Weber & R. Kiew) A. Weber, comb. nov.
 ≡ *Didissandra porphyrantha* A. Weber & R. Kiew, in Kiew & Weber,
 Gard. Bull. Singapore 41: 1 (1988).

Type: Selangor, Gunung Bunga Buah, E of summit, 1300 - 1400 m; 11.VII.1984, WEBER & ANTHONYSAMY 840711-1/3 (holo WU, iso E, K, KLU, L, UPM, WU).

Etymology: porphyranthus = purple-flowered.

Description: Stem woody in the lower part, to 50 cm long, sometimes branched, base decumbent and rooting; upper (leaf-bearing) part villous with red-brown hairs. Leaves in pairs, c. 2 cm distant; petiole 2 - 3 cm, red-brown hairy; lamina 10 - 20 x 3 - 6 cm, oblanceolate-subfalcate, base attenuate, apex acuminate, margin distantly serrate-crenate (teeth c. 1,5 mm long, c. 1 cm distant); upper surface glabrous, lower surface with sparse hairs on veins. Peduncle 5 - 8 cm long, glabrous or sparsely hairy, with 1 or 2 flowers; bracts 2, lanceolate. Pedicel 1 - 1,5 cm. Sepals connate in the lower part, narrowly triangular, blunt, (sub)glabrous. Corolla c. 5 cm long, tube narrow cylindrical at base, then gradually widening, lobes rounded; tube violet, limb very dark violet, nearly black, throat with 8 white lines. Stamens 4, white, didynamous, anthers cohering in pairs. Disc shortly cylindrical, shallowly 5-lobed. Ovary cylindrical, tapering towards the base, style short, stigma broadly triangular. Capsule 6 - 8 cm long, hard and thickly fleshy, slightly curved.

Illustrations: Fig. 1b [leaf], 4 [habit]; KIEW & WEBER 1988: Fig. 1, 2 [habit, flower, fruit; leaf glands, seed], SONTAG & WEBER 1998: Fig. 3a, b [seed, testa].

Distribution: Peninsular Malaysia. Selangor: Gunung Bunga Buah, 1300 - 1400 m; Ulu Gombak F. R., comp. 25; waterfall on Sg. Batu, 200 m.

Ecology: primary montane forest; on slopes in shade; also lower down by seed transport by streamlets.

Chromosome number: $2n = c. 34$.

Notes: *Ridleyandra porphyrantha* is a most beautiful plant, having large violet flowers with a nearly black limb and white narrow lines running into the tube. It forms fairly extensive stands on a side ridge of Gunung Bunga Buah in the Genting Highlands.

Specimens: ANTHONYSAMY SA 337 (E, KEP). - KIEW RK 1040 (KEP). - KIEW B. H. RK 2096 (KEP). - KOCHUMMEN FRI 16722 (K, KEP). - WEBER & ANTHONYSAMY 840711-1/3 (E, K, KEP, L, WU; type).



Fig. 4. *R. porphyrantha*, Peninsular Malaysia, Pahang/Selangor, Gunung Bunga Buah (phot. A. W.).

5. *Ridleyandra corneri* A. Weber, spec. nov.

Diagnosis: *R. porphyranthae* proxime affinis, sed caule robustiore et omnino lignoso, foliis maioribus in apice aggregatis et dentibus obtusis differt.

Type: Trengganu, Kemaman, Bukit Kajang, 900 ft.; 4.XI.1935, CORNER 30211 (holo SING, iso E, K, SING; photo WU).

Etymology: Named in honour of the famous botanist and mycologist E. J. H. CORNER (1906 - 1996), the first and so far only collector of the plant.

Description: Stem to 60 cm tall, 0,5 - 0,8 cm thick, woody. Leaves in a dense terminal rosette; petiole 3 - 8 cm long, glabrous; lamina 15 - 25 x

4 - 6 cm, lanceolate-falcate, base cuneate, sometimes unequal, apex acute to shortly acuminate, margin obtusely serrate, side veins 10 - 13 subopposite pairs, 'green above, light greenish below', glabrous on both sides inflorescence axillary, peduncle 8 - 15 cm long, purple. 'Pedicel and calyx purple. Corolla tube pale lilac-purple with broad deep lilac-purple stripes, limb scarcely dilated, deep violet-purple, almost black. Stamens 4, cream yellow. Fruit 5 - 6 cm long, straight, purple' (CORNER 30211).

Distribution: Peninsular Malaysia. Terengganu: Kemaman, Bkt. Kajang.

Ecology: In lowland forest, on rocky sides of streamlets.

Chromosome number: Unknown.

Notes: *Ridleyandra corneri* is closely allied to *R. porphyrantha*, but is much more robust, with a stout woody stem bearing the leaves in a dense apical rosette. The leaves are larger, with blunt teeth at the margin. The flower form and coloration is apparently similar to that of *R. porphyrantha* (as well as of *R. atrocyanea* and *R. kiewii*). A more detailed character comparison is given in Table 2.

Specimens: CORNER 30211 (E, K, SING; type).

Table 2
Distinctive features of *Ridleyandra corneri* and *R. porphyrantha*

	<i>R. corneri</i>	<i>R. porphyrantha</i>
Stem	to 60 cm tall woody throughout with few hairs	20 - 40(-50) cm woody at base, herbaceous in the upper (leaf-bearing part) villous from red-brown hairs in the upper part
Leaves	in a dense terminal rosette, opposite arrangement not obvious	leaf pairs very loosely tufted, with c. 2 cm long internodes between, opposite arrangement obvious
Petiole	3 - 8 cm glabrous	2 - 3 cm red-brown hairy
Lamina	10 - 20 x 3 - 6 cm base cuneate teeth blunt	15 - 25 x 4 - 6 cm base attenuate teeth pointed

6. *Ridleyandra atropurpurea* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra atropurpurea* Ridl., J. Linn. Soc. 32: 504 (1896); Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 23 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 742 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 952 (1909); Ridl., Fl. Malay Penins. 2: 504 (1923).

Type: Perak, Hermitage Hill, 1892 RIDLEY s.n. (SING).

Etymology: atropurpureus = dark purple; the flower colour.

Description: Stem woody, lower part probably buried and rooting, upper part to several cm long. Petiole 3 - 4.5 cm long; lamina 12 - 14 x 4 - 5 cm; oblong or (ob)lanceolate, base cuneate, partly unequal; apex broadly acute or rather obtuse; margin subentire to obscurely crenate; upper surface glabrous, lower hairy on the nerves. Peduncle 9 - 15 cm long, ± glabrous, purple, with two ovate bracts, c. 10 x 4 mm. Flowers 2 - 3 on top of peduncle, pedicels short. Sepals free to the base, lanceolate, acute, c. 7 mm long, glabrous. Corolla deep purple, c. 5 cm long, 1 - 1.5 cm broad, narrowed at the base, widely dilated above; lobes short, rounded. Stamens 4, didynamous; filaments slender, anthers cohering in pairs. Capsule c. 6 cm long.

Distribution: Peninsular Malaysia. Perak: Hermitage Hill. Kedah-Perak boundary: Gunung Bintang.

Ecology: Details unknown, but apparently similar ecological position as *R. atrocyanea* (primary montane rain forest).

Chromosome number: Unknown.

Notes: *Ridleyandra atropurpurea* is certainly closely related to *R. atrocyanea*, differing mainly by the leaf form. The plants from G. Bintang (HANIFF 21092) look slightly different in the non-corrugate leaves and have several flowers on the peduncles. More information is needed to decide if these plants represent a separate variety, subspecies or even species.

Specimens: HANIFF 21092 (BO, K, SING). - RIDLEY s.n., 1892 (SING; type).

7. *Ridleyandra petiolata* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra petiolata* Ridl., Fl. Malay Penins. 2: 504 (1923).

Type: Perak, Gunung Inas, 5600 - 5880 ft., 20.XII.1899, YAPP 499 (CGE, K, photo E).

Etymology: petiolatus = petiolate; the leaves.

Description: Stem woody, unbranched, for the most part buried in the ground. Leaves few in a rosette; petiole 4 - 8 cm long, rather slender, reddish hairy; lamina 9 - 13 x 3 - 6 cm, elliptic or obovate, base cuneate, sometimes truncate, apex acute to slightly acuminate, margin crenulate-serrate; upper side glabrous, beneath pale, sparsely hairy with long hairs at the nerves. Peduncle 15 - 25 cm long, reddish hairy, bearing several flowers at the top; bracts 2, opposite, 15 x 7 mm, broadly lanceolate, hairy. Pedicel 2 - 3 cm, slender. Sepals broadly lanceolate, acute, 10 - 15 x 3 - 4 mm, hairy. Corolla c. 4,5 cm long, 1,5 cm wide at the mouth; tube shortly narrowed at the base, gradually widening upwards, sparsely pubescent outside, limb 2,5 cm across, lobes rounded. Stamens 4, filaments slender, c. half as long as tube, anthers cohering in pairs. Capsule c. 4,5 cm, curved with apex pointing downwards, glabrous, purple.

Illustration: Fig. 2a, b [leaves].

Distribution: Peninsular Malaysia. Kedah-Perak boundary: G. Bintang. Perak: Gunung Inas, 1500 - 1900 m (type loc.).

Ecology: Apparently primary montane forest.

Chromosome number: Unknown.

Notes: The species is still badly known. RIDLEY's comments following his description read (1923: 504): 'This is near *D. violacea* and *D. latiseptala*, but the sepals are broader lanceolate than in the first, and hairy. Some leaves are sparsely hairy above.' However, there is little doubt that the species is more closely related to *R. atropurpurea* (comparatively long-petiolate-leaves, broad bracts and sepals, several flowers on peduncle etc.).

Specimens: F. M. S. Museum s.n., VI.917 (K). - YAPP 499 (CGE, K, type).

8. *Ridleyandra flammea* (Ridl.) A. Weber, comb. nov.

= *Didissandra flammea* Ridl., J. Linn. Soc. 32: 503 (1896); Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 22 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 742 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 952 (1909); Ridl., Fl. Malay Penins. 2: 502 (1923);

= *Oreocharis obovata* Barnett, Kew Bull. 15: 249 (1961).

Type: Thailand, Bukit Nasi, Toh Moh, 600m; low herb; fls. red; 16.IV.1931, LAKSHNAKARA 646 (holo K, iso ABD, BKF, BM, E), syn. nov.

Type: [Peninsular Thailand, Narathiwat], Tomoh [Toh Moh; Legeh gold-mines], 1893, MACHADO s.n., cult. in Singapore Bot. Gard. (SING).

Etymology: flammeus = fiery; referring to the vivid coloration of the corolla (see 'Notes').

Description: Stem 3 - 5(-10) cm high, unbranched, hardly woody, densely hairy. Leaves opposite in somewhat unequal pairs; petiole 1,5 - 5 cm long, densely clad with short spreading pointed hairs; lamina 8 x 4,5 cm to 18,5 x 6,5 cm, obovate to oblong-obovate, broadly rounded at the apex, rounded to minutely subcordate at the base, often unequal sided (i.e. mid-rib not always central), glabrous above, underside with appressed hairs on the slightly raised veins and spreading hairs along the margin (these appearing as a fringe when seen from above), lateral nerves 10 - 12 on each side, not strictly paired. Peduncles axillary, 8 - 10 cm long, hirsute; bracts ovate-acuminate, c. 5 mm long, c. 2 mm broad at base, hirsute. Calyx divided into 5 subequal segments, united for c. 1,5 mm at base, 15 mm long (lengthening to 20 mm in fruit), long-tapered from 2,5 mm wide base, hirsute outside, with sessile glands within. Corolla 4,6 - 5 cm long; tube c. 4 - 4,5 cm (as pressed) c. 5 mm diam. near base, 15 mm at widest point, narrowing to 10 mm at throat, hairy outside, glabrous inside; limb slightly oblique, lower lobes c. 5 mm long, upper c. 3 mm long, all rounded. Stamens didynamous; lower filaments arising 18 mm above base, 15 mm long, upper arising 15 mm from base, 10 mm long, all flattened, glabrous; anthers cohering in pairs, tip to tip, opening downwards, thecae widely divaricate, connective forming a ± circular pad, 1,2 mm diam., glandular round edges. Disc c. 1,5 mm high, distinctly lobed. Ovary densely glandular pubescent, tapering into style, 4 mm long; stigma of lower lobe, expanded, lamellate. Young fruit c. 5 cm long, glandular pubescent.

Distribution: Peninsular Thailand, Narathiwat: Waeng, To Moh (including the area of the former Legeh goldmines).

Ecology: Evergreen forest; by streams, on stones, on hill top.

Chromosome number: Unknown.

Notes: RIDLEY described this species from a living plant grown at Singapore Botanic Garden; from this he made the following observations, additional to his formal description: 'The stem is soft, not at all woody; the leaves are of a curious grey-green colour, smooth and polished above, but the somewhat impressed nerves give it a bullate appearance. The flowers are of a fiery orange with darker red apices, and very handsome'.

BARNETT's referral of this species to *Oreocharis* clearly resulted from her description of the anthers as 'not coherent'. This may have been no more than a slip in note-making, for the anthers on her dissection on the type sheet of *Oreocharis obovata* (ABD) are still clearly united in pairs.

Both RIDLEY and BARNETT described the ovary as 'pubescent', without mentioning that the hairs are rather dense, spreading at right angles to the surface and gland-tipped. The preserved flowers of RIDLEY's plant agree exactly with those of the new plentiful material of *O. obovata*: in particular in indumentum of the ovary and in the anther-connective, which is nearly circular and glandular round the edge.

In its more herbaceous habit, flower colour, lack of an appendage on the anther-connective, glandular-pubescent ovary and fruit, *Ridleyandra flammea* deviates remarkably from the other Malayan species. Ripe seeds are unfortunately not available for comparison, but it does have the large expanded lower stigmatic lobe that is characteristic of the group, and its deviant features do not suggest any other affinity.

Ridleyandra flammea is at present known only from the vicinities of Toh Moh and Waeng, two places just on the Thai side of the Thai-Malay border and about 25 km apart. It is likely to be found in other less-accessible areas on either side of the international boundary.

Specimens: CP. & TS. [C. PHENGLAI & T. SMITINAND] 1180 (BKF, K), 1211 (BKF). - LAKSHNAKARA 646 (ABD, BKF, BM, E, K; type of *Oreocharis obovata*). - LARSEN 32898 (AAU). - MACHADO s.n., 1893 (SING; type). - PHUSOMSAENG 402 (E, K). - PRAYAD 471 (BKF). - SANGKHACHAND & NIMANONG 1208 (BKF, E). - SANGKHACHAND, PHUSOMSAENG & NIMANONG (BKF).

9. *Ridleyandra latisejala* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra latisejala* Ridl., J. Linn. Soc. 32: 503 (1896); Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 26 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 741 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 951 (1909); Ridl., Fl. Malay Penins. 2: 503 (1923).

Type: Thailand, [Narathiwat], Tomoh [Toh Moh] [prot.: Legeh gold-mines]; 1892, MACHADO s.n. (SING).

Etymology: *latisejala* = with broad sepals.

Description (RIDLEY 1905): Stem short, woody. Leaves crowded at the top of the stem, oblong-obovate, unequal at base; margins crenate-dentate; surfaces sparingly hispid, red; midrib and nerves beneath covered with red hairs; 14 cm long, 6 cm broad; petiole 3 cm long. Flowers few on a 18 cm long hispid peduncle. Calyx-lobes ovate, 3,8 mm long, glabrous. Corolla purple (?), 3 cm long, glabrous; tube cylindrical, dilated upwards; lobes short, rounded. Stamens 4; filaments linear; anthers subglobose. Ovary glabrous; stigma clubbed. Capsule short, 1,5 cm long, thick, fusiform.

Distribution: SE Thailand: Narathiwat.

Ecology: Primary evergreen forest.

Chromosome number: Unknown.

Notes: *Ridleyandra latisejala* was collected together with *R. flammea* by MACHADO (in 1892 and 1893, respectively) and sent to RIDLEY, who described the two species in 1896. Regarding *R. latisejala* RIDLEY made the following comments (1896: 504): 'I have only seen dried specimens of this. It is allied to *D. flammea* Ridl., and from the same locality, but has smaller glabrous flowers, and shorter and thicker capsules. The leaves are also toothed, and usually sprinkled over with coarse hairs, while the petiole and midrib are covered with red hairs. The flowers look if as they had been purple.'

The species has apparently never been re-collected and, therefore, nothing can be added to RIDLEY's description and comment.

Specimen: MACHADO s.n., 1892 (SING; type).

10. *Ridleyandra morganii* (Franch.) A. Weber, comb. nov.

≡ *Didissandra morganii* Franch., Bull. Soc. Linn. Paris, n.ser., 1: 124 (1899); Burt, Notes Roy. Bot Gard. Edinburgh 23: 100 (1960);

= *Didissandra filicina* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 27 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 744 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 954 (1909); Ridl., Fl. Malay Penins. 2: 505 (1923). HENDERSON, Malay Wild Flowers 2: 344 (1950, reimp. 1974).

Type: Perak, Gunung Chabang, on rocks overhanging a creek, s.dat., SCORTECHINI 14 (SING).

Type: Mountains of Malacca, 1884, DE MORGAN s.n. (P, photo E, K).

Etymology: Named after J. J. DE MORGAN (1857 - 1924), a French mining engineer, the collector of the type specimen.

Description: Stem woody, 1 - several dm long and to 1 cm thick, usually buried and rosette of leaves placed near the ground. Petiole 0,5 - 2 cm, hispid. Lamina 9 - 15 x 3 - 4,5 cm, lanceolate, base cuneate-attenuate, apex acute, margin deeply saw-toothed or lobed with oblong pointed or obtuse lobes; upper surface glabrous, lower side with appressed hairs on the midrib. Peduncle 7 - 10 cm, slender, purple, hispid-hairy; bracts very small, ovate, c. 3 mm long. Pedicel 5 - 8 mm long. Sepals elliptic, rounded, purple, sparingly hairy, 3 to 6 mm long. Corolla 4,5 - 5 cm long; tube with narrow base, dilated upwards, trumpet-shaped, sparingly pubescent at the base, mauve, inside darker, with white lines down the base; lower lip longer than the upper; lobes rounded. Stamens 4, didynamous,

anthers coherent in 2 pairs, the connective prolonged in a triangular horn. Disc annular. Capsule subfollicular, 4,5 - 5 cm long, glabrous.

Illustrations: Fig. 1f [leaf], 5 [flower]; HENDERSON (1950/74): Fig. 321B [leaf] (as *Didissandra filicina*); WEBER & KIEW 1984: p. 24 [flowering plant] (as *Didissandra morgani*).

Distribution: Peninsular Malaysia, central Main Range. Perak: Cameron Highlands (Ulu Telom) 1500 - 2000 m (many localities, including Tanah Rata, Parit Falls, Robinson Falls, G. Jasar, G. Berembun, Sg. Pauh valley, Boh plantations, Sg. Uruil, Bkt. Mentigi, Berinchang village,

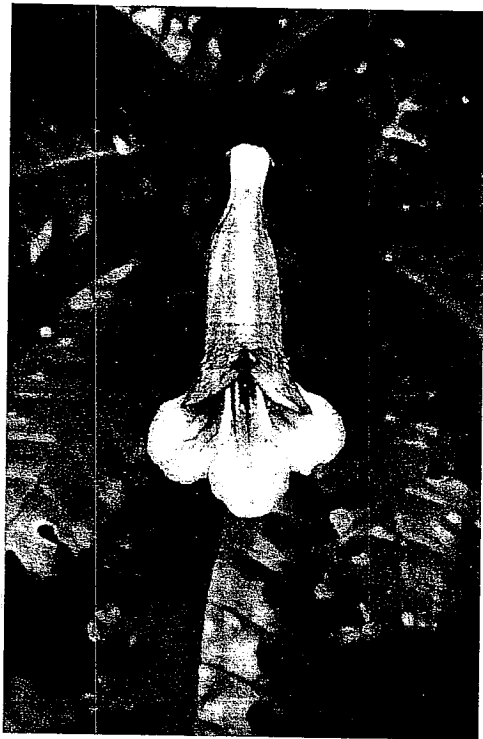


Fig. 5. *R. morganii*, Peninsular Malaysia, Pahang, Cameron Highlands (phot. A. W.).

G. Berinchang etc.); Lubok Tamang, 3500 ft.; Gunung Chabang; Gunung Kerbau, 1300 m; Sg. Groh, hill E of Gopeng, 500 m.

Ecology: Montane forest; also in somewhat disturbed places.

Chromosome number: $n = 17$.

Notes: *Ridleyandra morganii* is certainly the best known and most frequently collected of the Malayan species of *Ridleyandra*. It is abundant all over the Cameron Highlands (Pahang). It has beautiful blue-mauve flowers streaked with white lines. The species can be also easily recognized by the deeply saw-toothed leaves. The superficial similarity with fern-fronds inspired RIDLEY's epithet '*filicina*'. BURTT (1960) discovered that the species had been described previously by FRANCHET (1899) as *Didissandra morganii*.

Specimens: ABDUL SAMAT BIN ABDULLAH 122 (KLU). - ANTHONYSAMY SA 284 (UPM). - ANTHONYSAMY SA 437 (UPM). - BALGOOY 2643 (E, L). - BURKILL HMB 756 (L, SING). - BURKILL HMB.819 (K, L, SING). - BURKILL HMB 2838 (SING). - CHEW CWL 793 (HBG, K, L, SING). - CHEW CWL 1258 (HBG, K, L, SING). - HENDERSON 17954 (SING). - HENDERSON 10939 (BO, SING). - HENDERSON 11076 (K, SING). - JAMAT 27275 (SING). - KIEW RK 1030 (KEP). - KIEW RK 1031 (E, KEP). - KIEW RK 1037 (KEP). - KLOSS s.n., XI.1900 (SING). - MAXWELL 78 - 195 (L, SING). - NG FRI 1591 (K, KEP, SING). - NUR SFN 32962 (SING). - POORE 77 (K, KLU). - RAO & al. K. 8002 (L, SING). - RIDLEY 13603 (BM, K, SING). - ROBINSON s.n., 26.III.1913 (K). - ROBINSON s.n., 26.III.1913 (BM). - SCORTECHINI 14 (SING; type of *D. filicina*). - Sine coll., 8.III.1947, KEP KFN. 63 668 (K, KEP). - SINCLAIR 9921 (E, SING). - SMITH BE. 82 (K). - STONE 7245 (KLU). - TURNAU 848 (K, KLU). - T. & P. 271 (K, L, SING). - WEBER 790819-2/1 (WU). - WEBER 860819-4/1 (WU). - WEBER 870622-5/1 (WU). - WEBER 870624-1/3 (WU). - WOODS 619 (E).

11. *Ridleyandra kerrii* A. Weber, sp. nov.

Diagnosis: *R. castaneifoliae* in forma foliorum similis, sed ab hac et congeneris omnibus Malayensibus flore campanulato et sepalis corollae aequilongis differt.

Type: Thailand, [Yala], Betong, c. 300 m; on steep bank sloping down to stream in evergreen forest; corolla tube white, shading into violet on lobes; 13.VIII.1923, KERR 7608 (holo BM, 2-iso K).

Etymology: Named after A. F. G. KERR (1877-1942), the first (and so far only) collector of the plant.

Description: Stem woody, unbranched, densely long-hairy in the upper part. Leaves opposite, crowded at the top of stem. Petiole short,

c. 1 cm, hairy; lamina lanceolate-falcate, broadest in the upper third, apex acute, base attenuate; margin very coarsely and deeply serrate, with rather acute teeth; 15 x 4 - 30 x 6 cm; upper side glabrous, lower side glabrous except main nerve and proximal part of side nerves; nerves 15 - 20 subopposite pairs. Inflorescences axillary; peduncle 6 - 8 cm long, sparsely hairy, with 1 - 3 flowers at top; bracts lanceolate, c. 1 cm long, subglabrous. Pedicel c. 1 cm long. Sepals 5, free to base, very narrow (linear), nearly as long as corolla, with few long hairs at the mid-line. Corolla broad-tubular-campanulate, c. 1,5 cm long, at mouth c. 1 cm across; lower lobes somewhat larger than upper ones; 'tube white, shading into violet on the lobes'. Stamens 4. Disc not seen. Ovary glabrous. Capsule c. 3 cm long, rather thick and apparently fleshy in vivo; narrower at the base, tip curved downwards, opening along the upper side.

Distribution: Peninsular Thailand (known only from the type locality).

Ecology: 'On steep bank sloping down to stream in evergreen forest' (KERR 7608).

Notes: *Ridleyandra kerrii* was identified as 'near *R. castaneifolia*' by BARNETT (1962: 211), which species has indeed very similar leaves, but is completely different in the floral characters. The rather short, campanulate corolla of *R. kerrii*, with sepals roughly equalling the corolla, is otherwise unknown in Malayan species of *Ridleyandra*, but recurs in the Bornean *R. ornata*. As that species has a very different habit (narrow leaves with an entire margin and long hairs all over, single-flowered inflorescences) and pubescent ovary, *R. kerrii* is certainly not closely allied and its short corolla is without doubt a parallelism.

Specimens: Type (see above).

12. *Ridleyandra castaneifolia* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra castaneifolia* Ridl., J. Straits Branch Roy. Asiat. Soc. 86: 302 (1922); Ridl., Fl. Malay Penins. 2: 505 (1923).

Type: Pahang, Kwala Teku, SEIMUND s.n., XII. 1920 (K).

Etymology: castaneifolius = leaves like in a chestnut (*Castanea sativa*).

Description: Stem woody, 10 - 30 cm long, decumbent and rooting, erect-ascending part 5 - 10 cm. Petiole 1 - 4 cm, hairy; lamina 10 - 15 x 3,5 - 5 cm; lanceolate-oblong, base cuneate to rounded; apex acute; margin very coarsely serrate, teeth to nearly 1 cm long and broad, blunt. Peduncle 8 - 10 cm long, coarsely hairy, with 1 - 3 flowers; bracts linear-oblong, c. 4 mm. Sepals free to base, lanceolate, blunt, c. 10 x 3 mm, hairy. Corolla 2 - 2,5 cm long, sparsely short hairy, lobes small, limb

1,2 cm wide (in sicco), yellow (HANIFF & NUR 8081; uniformly pale lemon yellow: HOLTUM 20552, SING). Capsule c. 1,5 cm long, 4 mm thick.

Illustration: Fig. 1e [leaf].

Distribution: Peninsular Malaysia. Pahang: Gunung Tahan (Sungai Teku, Kuala Teku, "below ridge").

Ecology: Details are unknown, but apparently primary montane forest.

Chromosome number: Unknown.

Notes: *Ridleyandra castaneifolia* is unmistakable because of the very coarsely serrate leaves with blunt teeth, indeed recalling to some degree those of *Castanea sativa*. The yellow flower suggests that this species may be most closely related to *R. quercifolia*, rather than to *R. glabrescens* as RIDLEY himself thought.

Specimens: HANIFF & NUR 8081 (BO, K, SING). - HOLTUM 20552 (BO, K, SING). - KIAH SFN 31769 (BO, K, SING). - SEIMUND s.n., XII. 1920 (K; type).

13. *Ridleyandra quercifolia* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra quercifolia* Ridl., J. Linn. Soc. 32: 504 (1896). Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 26 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 743 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 953 (1909); Ridl., Fl. Malay Penins. 2: 505 (1923). Henderson, Malay. Wild Flowers 2: 344 (1950, reimp. 1974).

Type: Perak, Taiping Hills, on banks, II. 1892, RIDLEY 2910 (SING); [in descr. s.dat., s.coll., s.num.]

Etymology: quercifolius = oak-leaved

Description: Stem woody, several dm long, c. 5 mm thick, lower part horizontal and rooting, erect part to 30 cm long. Leaves crowded on top; petiole 1 - 2,5 cm long, hairy; lamina 12 - 15 (-20) x 4 - 5 cm, lanceolate, base narrowed, apex acute-obtuse, margin lobed by broad wavy teeth; upper surface dark green, glabrous, shining; lower side whitish green or glaucous, nerves brown hairy. Peduncle 10 - 20 cm long, sparsely hairy; bracts opposite, lanceolate-obtuse, c. 8 mm long; 1 (-2) flowers at top. Pedicel c. 2 cm long, slender. Sepals 7 x 3 cm, lanceolate-obtuse, green, ± glabrous. Corolla lemon-yellow, glabrous, 5 - 5,5 cm long; tube base narrow cylindrical, dilated and widening upwards; lobes short, rounded. Stamens 4, filaments c. half as long as corolla, anthers cohering in pairs. Ovary cylindrical; stigma triangular. Capsule 7 - 9 cm long, glabrous.



Fig. 6. *R. quercifolia*, Peninsular Malaysia, Perak, Bkt. Larut (drawing by D. HADL after a photo of A. W.).

Illustrations: Fig. 1d [leaf], 6 [habit], 7a [flower]; HENDERSON 1950/74: Fig.321D [leaf] (as *Didissandra quercifolia*).

Distribution: Peninsular Malaysia. Perak: Thaiping Hills, (1000-) 1400 - 1600 m (Maxwell's Hill, 'Caulfield's Hill, 'Birch's Hill', 'the Cottage', G. Hijau), Bkt. Rengas, 1300 m.

Ecology: Primary montane forest; also somewhat disturbed places.

Chromosome number: $n = 17$

Notes: The rather unusual yellow corolla and the coarse lobing of the leaves (cf. epithet) indicates a close relationship with *Ridleyandra casta-*

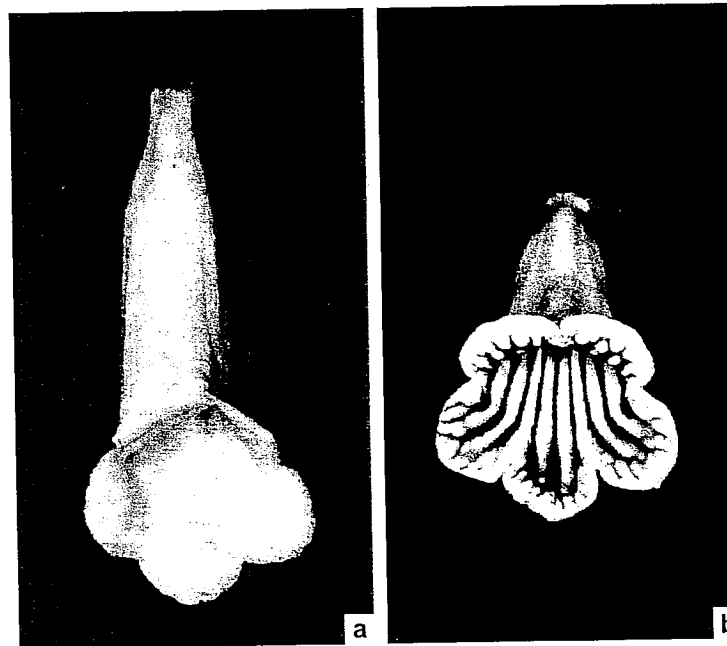


Fig. 7. Flower of (a) *R. quercifolia* (Peninsular Malaysia, Perak, Bkt. Larut) and (b) *R. longispala* (P. M., Pahang, Cameron Highlands) (phot. A. W.).

neifolia (yellow corolla; serrate leaf margin). *R. morganii* (with a blue-mauve corolla and deeply saw-toothed leaves) is certainly also very close. The species can be easily encountered in the upper part of Maxwell's Hill (Perak). It is most attractive with its large, yellow flowers and dark green, shining leaves of unmistakable form.

Specimens: ANDERSON 135 (SING). - BROOKS s.n., III. 1914 (K). - BURKILL & HANIFF 12869 (BO, SING). - CURTIS 2041 (SING). - CURTIS s.n., V. 1890 (SING). - DAVIS 69487 (E, KLU). - ERNST 1130 (L). - FOX 109 (SFN 10683) (SING). - HARDIAL & SAMSURI 284 (K, L, SING). - KING's coll. [KUNSTLER] 2171 (SING). - KLOSS s.n., 1908 (BM). - KOCHUMMEN FRI 2870 (KEP, L). - LONG s.n., 2.II.1909 (K) - RIDLEY 2910 (SING; type). - [cf. RIDLEY], VI. 1893, 2910 (BM). - RIDLEY & CURTIS s.n., VI. 1893 (SING). - SCORTECHINI s.n., s. dat. (SING). - SCORTECHINI s.n., III. 1884 (SING). - SHAH & SIDEK MS 1051 (E, K, SING). - SIDEK BIN

KIAH SK 451 (SING). - SINCLAIR & KIAH SF 38656 (BM, BO, E, K, SING). - SMITH GS 445 (KLU). - SPARE 2049 (SING). - STONE 14386 (KLU). - STONE 15443 (L, KLU). - 14540 (SING). - WEBER 840806-2/2 (WU 1, KEP). - WEBER 790822-1/2 (WU). - WEBER 840806-2/2 (WU, KEP). - WEBER 860816-1/1 (WU). - WRAY jr. s.n., s.dat. (K, SING).

14. *Ridleyandra serratifolia* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra serratifolia* RIDL, J. Straits Branch Roy. Asiat. Soc. 44: 25 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 740 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 950 (1909); Ridl., Fl. Malay Penins. 2: 503 (1923).

= *Didissandra hirta* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 25 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 740 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gamopet.) no. 21: 950 (1909); Ridl., Fl. Malay Penins. 2: 503 (1923).
Type: Perak, Bujong Malacca [Gunung Bujang Melaka], IX.1898, RIDLEY s.n. (SING).

Type: Perak, Bujong Malacca [Gunung Bujang Melaka], IX.1898, RIDLEY 9779 (SING).

Etymology: serratifolius = serrate-leaved.

Description: Stem woody, to 15 cm high, covered in the upper part with long, reddish-brown hairs. Leaves opposite, crowded at the stem top; petiole 1 - 3 cm, coarsely hairy; lamina 15 - 30 x 4 - 7 cm, oblanceolate, base attenuate, apex acute to shortly acuminate, margin (partly doubly) serrate, teeth acute; upper surface sprinkled with pale or reddish multicellular hairs, lower side glabrous except the midrib and side nerves. Peduncle 8 - 12 cm long, bearing a single flower, bracts immediately below the calyx. Sepals to 1 cm long, lanceolate, acute, somewhat spreading or recurved, densely covered with reddish-brown multicellular hairs. Corolla blue or violet, c. 4.5 cm long; tube narrowed at the base, dilated upwards, broad, sparingly hairy; lobes rounded. Stamens 4, filaments c. half as long as corolla, anthers cohering in pairs. Capsule c. 4.5 cm long, rather thick, glabrous.

Distribution: Peninsular Malaysia: only known from the type locality: Perak: Gunung Bujang Melaka.

Ecology: In primary montane forest.

Chromosome number: Unknown.

Notes: *Didissandra hirta* is reduced here to synonymy with *Ridleyandra serratifolia*. Its only distinctive character given by RIDLEY (1909, 1923) (leaves simply serrate vs. doubly serrate) can be observed neither

in the type specimens nor in other collections. As the type specimens are from the same mountain and RIDLEY's descriptions match in the essential points (the corolla colour - 'violet, centre darker' - is only given for *D. hirta*; but the type specimen of *D. serratifolia* also shows that the flower must have been of a rather dark blue or violet colour), there can be no doubt that they are conspecific.

The name '*serratifolia*' is given preference over '*hirta*' as it appears more suitable.

Very closely related, possibly even conspecific is *R. longisepala* (see notes under that species).

The collection HANIFF 14244 (SING) from Jor (Perak), identified as *Didissandra atrocyanea*, may also belong to this species.

Specimens: SHAH & SHUKOR MS 3390 (KEP, KLU). - RIDLEY s.n., IX. 1898 (SING; type of *D. hirta*). - RIDLEY 9779 (SING; type).

15. *Ridleyandra longisepala* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra longisepala* Ridl., J. Fed. Malay States Mus. 4: 49 (1909); Ridl., Fl. Malay Penins. 2: 503 (1923). Henderson, Malay. Wild Flowers 1: 344 (1950, reimp. 1974);

Type: Pahang, Cameron's Plateau, [prot.: track to Gunung Irau]; [flowers] violet pale inside; VII. 1900, KLOSS s.n. (holo SING, iso SING).

Etymology: longisepalus = with long sepals.

Description: In habit very similar to *R. serratifolia*, but sepals longer (to 1.5 cm) and corolla dirty white with dark violet longitudinal streaks following the main nerves. By branching of the nerves the corolla lobes become marbled.

Illustrations: Fig 1c [leaf], 7b [flower]. According to SMITH (note on herb. specimen BE. 85, K) the plant has been painted by Mrs. EVERARD.

Distribution: Peninsular Malaysia. Pahang: Cameron Highlands (Telom, Robinson Falls, G. Irau, G. Jasar; 1500 - 1700m); Fraser's Hill (halfway along waterfall to Pine tree Hill; 1300m).

Ecology: Primary montane forest; at creeks and steep slopes.

Chromosome number: $2n = 34$.

Notes: RIDLEY (1909: 49) stated: "This is allied to *Didissandra wrayi* Ridl., but differs in the larger serrate hairy sepals and different colouring". The relationship, however, is certainly much closer with *R. serratifolia*. In fact, the plant may represent only a variety/subspecies of that species (which is, however, still incompletely known). The main difference is in the flower colour: *R. longisepala* has dirty white flowers with

dark violet lines in the tube and at the lobes, in *R. serratifolia* the flower is (fide RIDLEY) violet with darker centre.

Specimens: CHIN 287 (KLU). - CORNER s.n., 4.II.1932 (SING). - CORNER s.n., 16.VII.1937 (SING). - HENDERSON 11139 (SING 2?). - HOLTUM 23508 (BO, SING). - KLOSS s.n., VII. 1900 (SING; type). - MAXWELL 78-144 (L, SING). - RIDLEY 13602 (BM, SING). - SMITH BE. 85 (K). - WEBER 870622-3/9 (WU). - WEBER 870623-2/4 (WU).

16. *Ridleyandra wrayi* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra wrayi* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 24 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 743 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gampet.) no. 21: 953 (1909); Ridl., Fl. Malay Penins. 2: 504 (1923).

Lectotype (chosen here): Perak, Gunung Batu Puteh, summit, 6700 ft.; leaves shining dark green, whitish beneath; flower white pencilled violet, calyx white, bracts pale green; [s. dat.] WRAY 334 (SING).

Etymology: Named after L. WRAY (1855 - 1942), the first and apparently only collector of the plant.

Description: Stem woody. Leaves crowded at the top; petiole 1 - 1.5 cm long, hispid hairy; lamina 12 - 18 x 4 - 6 cm, (ob)lanceolate-subfalcate, base attenuate, apex acute to shortly acuminate, margin dentate with rather distant, blunt teeth; upper side glabrous, lowerside with coarse reddish hairs at the nerves. Peduncle to 12 cm long, especially the base covered with reddish hairs, bearing a single flower; bracts 2, c. 8 mm long, very broad, appressed to the calyx, glabrous. Sepals broadly lanceolate, obtuse, glabrous, to 15 mm long, white. Corolla white pencilled with violet, 4 - 4.5 cm long; tube thick, over 7.5 mm across; lobes broad, rounded. Stamens 4, didynamous; anthers cohering in pairs. Capsule slender, 4.5 - 6 cm long, glabrous.

Illustrations: Fig 8a, b [flower and flower bud of herb. specimen].

Distribution: Peninsular Malaysia. Perak: Gunung Batu Puteh (summit), c. 2000 m.

Ecology: Primary upper montane rain forest.

Chromosome number: Unknown.

Notes: *Ridleyandra wrayi* is apparently closely allied to *R. violacea*. It differs from that species by (a) a more pronounced serrature of the leaves, (b) broad, blunt sepals and (c) broad bracts enclosing the calyx. The flowers are apparently of a similar size. In the colour of the corolla *R. wrayi* seems to match with *R. longisepala*.

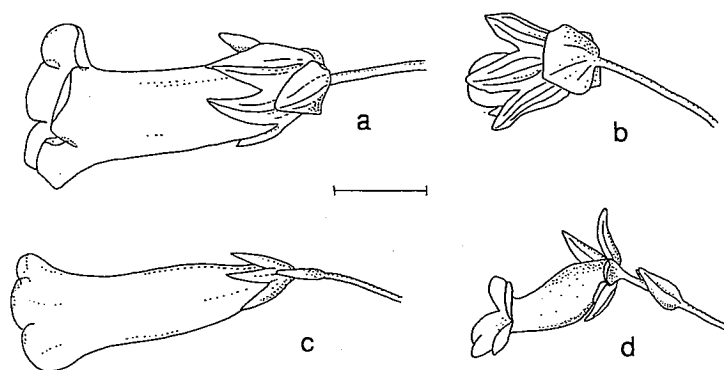


Fig. 8. Flowers of (a, b) *R. wrayi* (WRAY 353, SING), (c) *R. violacea* (SCORTECHINI 389b, SING) and (d) *R. stellata* (drawn after a photo of A. W.). Bar: 1 cm.

In the original description RIDLEY (1905) referred to 3 collections: WRAY 334, WRAY 383 (an error for 353), and KING's coll. 8036. The last one, however, represents *R. violacea*.

Specimens: WRAY 334 (SING; lectotype). - WRAY 353 (SING; syntype).

17. *Ridleyandra violacea* (Ridl.) A. Weber, comb. nov.

≡ *Didissandra violacea* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 23 (1905); Ridl., in King & Gamble, J. Asiat. Soc. Bengal 74 (2), extra no. 742 (1908), reimp. in King & Gamble, Mat. Fl. Malay Penins. 2 (Gampet.) no. 21: 952 (1909); Ridl., Fl. Malay Penins. 2: 504 (1923).

Lectotype (chosen here): Perak, summit of Gunung Batu Puteh, 6700 ft.; fl. violet; [s. dat.], WRAY 383 (SING).

Etymology: violaceus = violet, the corolla colour.

Description: Stem woody, c. 20 cm high. Leaves tufted at the stem top; petiole short; lamina 12 - 20 x 3 - 6 cm, oblanceolate-subfalcate, base attenuate, apex shortly acuminate, margin sinuate; upper surface glabrous; midrib and petiole covered with red multicellular hairs. Peduncles numerous, 6 to 9 cm long, sparsely red-hairy, 1-flowered; bracts linear-lanceolate, narrow, 7 to 15 mm long. Sepals linear-lanceolate, glabrous, 7 - 10 mm long. Corolla violet, 3 - 4.5 cm long; tube rather narrow, gradually dilated upwards. Stamens 4, filaments slender, anthers cohering in pairs. Capsule c. 4.5 cm long.

Illustrations: Fig. 8c [flower of herb. specimen].

Distribution: Peninsular Malaysia. Perak: Gunung Batu Puteh, 1000 - 2000 m (type locality).

Ecology: Primary montane rain forest.

Chromosome number: Unknown.

Notes: The species is so far known only from the two syntypes WRAY 383 (G. Batu Puteh) and SCORTECHINI 389b (Perak, s.l.) as well as KING's coll. 8036 (see below). In habit the plant matches *R. stellata*, but the flowers are much larger (3 - 4,5 cm), different in form ('tube rather narrow, gradually dilated upwards', RIDLEY 1909; probably approaching the usual type) and deep blue-violet.

On grounds of the bract and sepal characters as well as of the corolla colour ('rich blue, towards the calyx bluish white'), the collection KING's coll. 8036 (a syntype of *R. wrayi*) must be assigned to *R. violacea*.

Specimens: KING's coll. [KUNSTLER] 8036 (SING; syntype of *R. wrayi*). - SCORTECHINI 389b (K, SING; syntype of *R. violacea*). - WRAY 383 (SING; lectotype).

18. *Ridleyandra stellata* A. Weber, sp. nov.

Diagnosis: *R. violaceae* proxime affinis, sed floribus minoribus (1,5 cm longis tantum, nec 3 - 4 cm), sepalis lanceolatis patentibus, corollae forma et colore (albo-violascenti) differt.

Type: Perak, Kinta/Batang Padang distr.; Gunung Bujang Melaka, below top; montane forest; calyx spreading, whitish, corolla white suffused pink; 20.V.1987, WEBER & ANTHONYSAMY 870520-1/3 (WU).

Etymology: The epithet refers to the star-like spreading white sepals.

Description: Stem woody, 15 - 25 cm high, to 0,5 cm in diam. Leaves (rather densely) tufted at top of stem; petiole 2 - 4 cm long; lamina 12 - 15 x 3 - 4 cm, oblanceolate-subfalcate, base attenuate, very gradually narrowing into the petiole, apex acute to shortly acuminate, margin subentire-undulate; upper surface glabrous; midrib, side-veins and petiole sparsely covered with reddish hairs below. Peduncles very thin, 5 - 7 cm long, 1-flowered, bracts 2 - 3 mm long, linear, placed 1 - 1,5 cm below the flower; often old peduncles present. Sepals lanceolate, c. 8 mm long, glabrous, spreading, white. Corolla white, with a violet tinge, c. 1,5 cm long; tube cylindrical, somewhat depressed. gradually widening, sparingly pubescent; lobes rounded, subequal. Stamens 4, in 2 pairs. Ovary glabrous, rather short; stigma large, hemispherical, nearly filling the corolla mouth. Capsule c. 1 cm long, somewhat fusiform, opening along the upper side.

Illustrations: Fig. 1a [leaf], 8d [flower], 9 [flowering plant].

Distribution: Peninsular Malaysia. Perak: Gunung Bujang Melaka.

Ecology: Primary montane forest; on rocks, slopes, and at creeks.

Chromosome number: $n = 17$.

Notes: The flowers of *Ridleyandra stellata* are markedly smaller (c. 1,5 cm) than in *R. violacea* and the corolla is white, eventually with a pinkish or violet hue. The white, much broader sepals spread in a star-like manner at nearly right angles from the corolla and give the flower a somewhat orchid-like appearance. The stigma is very large, hemispherical and fills almost completely the corolla mouth.

Specimens: Type cited above.



Fig. 9. *R. stellata*, Peninsular Malaysia, Perak, Gunung Bujang Melaka (phot. A. W.).

Sect. *Stilpnothrix*19. *Ridleyandra tenella* (B. L. Burtt) B. L. Burtt, comb. nov.

≡ *Didissandra tenella* B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 31: 41 (1971).

Type: Sarawak, [Seventh Division], SE Hose Mts., hill west of falls in Ulu Melinau, in moss on wet shaded rock face, fl. palest mauve, solitary, 22. VIII. 1967, BURTT & MARTIN B.5059 (holo E, iso SAR).

Etymology: tenellus = delicate, referring to the small and delicate habit of the plant.

Description: Low herb, clothed with long brown hairs intermingled with white ones; stem thin, rooting. Leaves opposite, slightly to strongly unequal; petiole to 12 mm long; lamina elliptic, generally to 35 mm long and 18 mm broad, but reaching 60 x 35 mm, apex acute or somewhat obtuse, base abruptly and unequally narrowed, margin crenulate. Flowers solitary, axillary; pedicel slender, c. 30 mm long; bracts 2, c. 1,5 mm long, placed near the calyx. Sepals 3 - 4 mm long, linear-oblong. Corolla tubular, limb bilabiate, patent; tube 1 cm long, very sparingly pubescent outside, glabrous within; upper lip with two rounded lobes, 6 x 6 mm, ciliate; lower lip 1 cm long, 3-lobed, lobes 6 x 7,5 - 8 cm, rounded, slightly ciliate. Stamens didynamous, coherent in pairs; the posterior filaments inserted 2 mm above the corolla base, 4 mm long, the anterior ones 1,5 mm above the corolla base, 5 mm long, all slender and glabrous; anthers with widely divaricate thecae, c. 0,5 x 1 mm. Ovary c. 6 mm long, pubescent, tapering into the 2 mm long style; stigma club-shaped, minutely papillose. Capsule straight, 13 mm long, glabrescent, dehiscent on upper side. Seeds blackish-brown, ellipsoidal, pointed at both ends, 0,4 mm long, reticulate.

Illustrations: BURTT 1971: 42, Fig. 1A & B [habit, flower and floral details]; SONTAG & WEBER 1998: Fig. 4a, b [seed, testa].

Distribution: Borneo. Sarawak: 4th Div.: G. Mulu, 1200 m. 7th Div.: Hose Mts. (Ulu Melinau; Ulu Temalad, Mujong, 900m) and Linau-Balui divide (Bkt. Dema); Sabah: Mt. Kinabalu (Penibukan, 1200 - 1500m; Colombon River, 1350m; Penataran River, 1200m).

Ecology: Damp, shaded rocks in Dipterocarp forest.

Notes: *Ridleyandra tenella* is a small, creeping-ascending plant with long rufous hairs similar to *R. rufa* (though intermingled with white ones). The corolla tube is much longer than in that species, but shorter and broader than in *R. synaptica*. *R. tenella* has an exceptional seed ornamentation: half-moon-shaped thickenings along the cell walls (SONTAG

& WEBER 1998, Fig. 4). As the other nine species of *Ridleyandra* investigated so far have a single longitudinal bar in the middle of the cell, and as *R. tenella* is the only species with creeping herbaceous habit, its inclusion in the genus is somewhat doubtful. The possibility that the specimens cited represent more than one species was mentioned by BURTT (1971) when describing *Didissandra tenella*.

Specimens: ASHTON S. 17629 (E, SAR). - BURTT 11330 (E). - BURTT & MARTIN B. 5059 (type). - BURTT & WOODS B. 2157 (E). - CLEMENS 30732 (BM, BO). - CLEMENS 32520 (BM, BO). - CLEMENS 34032 (BM, BO).

20. *Ridleyandra synaptica* (B. L. Burtt) B. L. Burtt, comb. nov.

≡ *Didissandra synaptica* B. L. Burtt, Notes Roy. Bot. Gard. Edinburgh 35: 374 (1977).

Type: Kalimantan, W. Borneo, Kapuas Gebiet, Bukit Tilung, 1000 m, Blüte weiß, Schlund außen basalwärts hellviolett, 9.II.1925, WINKLER 1512 (holo HBG, photo E; BO).

Etymology: The epithet indicates that the species links *R. rufa* with species having a long corolla tube.

Description: Rosulate herb. Petioles 2- 7 cm long, with up to 5 mm long brown setose hairs. Lamina 6 - 7 x 2,3 - 3 cm, ± elliptic, slightly oblique, clothed with long brown setose hairs on both sides; 7 upcurving lateral veins on each side. Peduncles axillary (the old ones persistent), 7 - 13 cm long, brown-setose, 2-flowered; bracts 3 x 0,5 mm, linear, obtuse, brown-setose. Pedicels c. 2 cm long, c. 3 cm at fruiting, brown-setose. Corolla 3 cm long; tube 2 cm long, (in sicco) 4,5 mm wide, in the lower part slightly curved, thinly pilose-pubescent outside; upper lip probably recurved, c. 1,5 mm; lower lip projecting forward, 5 mm, slightly trilobed. Anterior stamens 1,3 cm, the posterior ones 1 cm long; anthers included, 0,5 mm long. Gynoecium 1,5 cm long, pilose-pubescent.

Distribution: Borneo. Kalimantan: Kapuas, Bkt. Tilung, 1000m; Kapuas, Lianggagang.

Ecology: Apparently primary rain forest; no details known.

Notes: *Ridleyandra synaptica* is known only from the hills drained by the upper tributaries of the Kapuas river. The type sheet has only a single mounted flower and it has therefore not been dissected and only scanty floral details can be given. *R. rufa* is extraordinarily similar to *R. synaptica* in vegetative features but can be distinguished when out of flower by the short white hairs mixed with the longer brown ones on the pedicels.

Specimens: HALLIER 2625 (BO, L). - WINKLER 1512 (type).

21. *Ridleyandra natunae* B. L. Burt, sp. nov.

Diagnosis: *R. rufae* C. B. Clarke affinis, sed foliis oblongis apice sub-obtusis, corollae tubo longiore (6 mm, nec 3 mm tantum) et latiore in limbum minus abrupte transeunte, lobis corollae subaequalibus (nec lobo antico aliis distincte majore), filamentis omnibus rectis (nec anticis apices versus U-flexis), antheris per paria apicibus cohaerentibus (nec omnibus inter se cohaerentibus) distinguitur.

Etymology: Named after the home of the plant, the Natuna Islands.

Type: Indonesia, Natuna Islands, Mt. Rany, 2000 ft.; flowers violet; VIII. 1894, G. D. HAVILAND & HOSE [but see comments below] 3532 (holo K).

Description: Herb with thin straggling woody stem 1-1,5 mm diam., rooting in the lower part, the leaves clustered near the tips. Leaves opposite, petiolate; petiole with long multicellular hairs (up to 3 mm) over a dense covering of short thick papillae, 2-4 cm long; lamina oblong or widest slightly above the middle, 3-5 x 1-1,5 cm; blunt at the apex, abruptly narrowed to the rounded or even minutely cordate base, glabrous above or with a few long hairs near the margin, ciliate with long hairs on the margins and with a few scattered long hairs below, the margins themselves bluntly denticulate. Inflorescence axillary, probably 4-flowered; peduncle c. 12 cm long, pilose with spreading hairs. Calyx-tube 1-1,5 mm long; the 5 lobes unequal, the largest 2 mm on short margin, 3 mm on long margin, 2 mm wide, the smallest (adjoining) 1,5 x 1,2 mm, remainder slightly smaller than the largest, all glabrous inside, red-bristly outside. Corolla tube 3 mm diam. at base (pressed), 6 mm long, expanded upwards, shortly pilose outside; lobes subequal, \pm campanulately disposed, \pm 7 mm long, 2 upper more shallowly separated, all shortly glandular on the margins. Stamens 4; filaments flat, glabrous, 1-nerved, the anticous pair rising 3 mm above corolla-base, 2,5 mm long, the posticous 4 mm above base, 3 mm long; anthers 2,5 x 2 mm at base, (thecae slightly divergent), dehiscing longitudinally by almost marginal slit, cohering in pairs at tip by anther-tissue, connective broadly triangular not-reaching tip of anther; staminode a mere tooth 3 mm above corolla-base, but clearly decurrent to it. Disc annular, 0,75 mm high, thin, partly adnate to base of corolla (perhaps not functional?). Gynoecium 10 mm long; ovary c. 7 mm, rather densely pubescent (hairs scarcely 0,5 mm long, even-lengthed but some pointed, some gland-tipped), unilocular, gradually tapering into style that becomes glabrous upwards and expands at top into 1 mm wide stigma.

Distribution: Borneo, Natuna Islands.

Notes: *Ridleyandra natunae* differs from both *R. rufa* and *R. synaptica* in its oblong leaves (and these two species are themselves indistinguishable in leaf-shape, which is \pm ovate-lanceolate); however, it is intermediate between these two allies in form of corolla and anthers: the tube (6 mm) widens in the upper part so that the corolla is subcampanulate and the limb is smaller and less flat than in *R. rufa*; the stamens are slightly didynamous; the anthers are united in two separate pairs, but these are placed very closed together.

When superficially examined some years ago, this specimen was thought to belong to the genus *Beccarinda* and was mentioned (BURTT 1963: 250) as helping to provide a considerable extension to the range of that genus. The Sumatran specimen mentioned at the same time is indeed a true species of *Beccarinda* (BURTT 1998); but this plant from Natuna is better placed in *Ridleyandra* sect. *Stilpnothrix*, its greater affinity with *R. rufa* and *R. synaptica* being shown by the hairy ovary. All the species of *Beccarinda* have a glabrous ovary: they also have a distinctive expansion at the base of the fruit, but there is no sign of this on the one very young fruit of *R. natunae*.

The plant has not been re-collected since being found in 1894, but just who found it seems to be rather uncertain. The specimen at K bears a HAVILAND & HOSE label as cited above, but it seems (VAN STEENIS-KRUSEMANN 1950) that the only collections made on the Natuna Islands were by ERNEST HOSE (CHARLES HOSE's nephew), who joined a zoological expedition organized by the Earl of Derby. It may well have been that ERNEST HOSE was the one who actually visited the islands, but then he passed his botanical collections to CHARLES HOSE (or to HAVILAND), who used available HAVILAND & HOSE labels before in his turn passing them to Kew. BURTT has been allowed to consult the HAVILAND correspondence at Kew, but there is no mention of collections from Natuna.

Specimen: Type cited above.

22. *Ridleyandra ornata* (C. B. Clarke) B. L. Burt, comb. nov.

\equiv *Didissandra ornata* C. B. Clarke in A. & C. DC., Monogr. phan. 5/1: 69, t. VIII (1883); B. L. Burt, Notes Roy Bot. Gard. Edinburgh 21: 197 (1954); B. L. Burt, Notes Roy Bot. Gard. Edinburgh 31: 40 (1971).

Lectotype (chosen here): Borneo, Sarawak, in monte Mattang, BECCARI 1889 (P, isolecto FI-B, K - mixed with LOBB s.n.).

Etymology: ornatus = decorated (by long, pale, glistening hairs).

Description: Stem woody, usually unbranched, 15-30 cm high, to 0,8 cm thick, densely covered by the leaf scars in the upper part. Leaves decussate on young shoots, then apparently in whorls or alternate,

placed in a very dense rosette at top of the stem; petiole 1 - 5 cm long, hairy; lamina narrowly lanceolate, sometimes falcate, 10 - 25 cm long, 1,5 - 3,5 cm broad, base attenuate, apex narrowly acute to acuminate, margin entire to subdentate; lateral nerves 12 - 20 subopposite pairs; upper side and margin loosely studded with 5 mm (or more) long, multicellular, eglandular hairs; lower side hairy on nerves. Peduncle 7 - 12 cm long, villous, bearing a single flower, two small linear bracts in the upper part. Sepals free to base, 2- 3 mm long, hairy. Corolla c. 1 cm, obliquely campanulate, pubescent on the outside, tube white, limb white to pale violet blue; tube 6 mm long. Stamens 4, filaments 4 mm, arising right at base of corolla, anthers 2,5 x 2 mm, connivent. Ovary densely pubescent. Capsule to 2,5 cm long, opening at the upper side.

Illustrations: Fig. 10, reproduced from CLARKE 1883, t. VIII; SONTAG & WEBER 1998: 3g, h [seed, testa].

Distribution: Borneo. Sarawak: 1st Div: Matang, 400 - 850 m (most collections); foot of Penrissen; Sabal F. R. (between Serian and Simanggang); Bako Nat. Park, Tanjong Po; Gunung Santubong, 400 m. Sarawak, 2nd Div.: G. Silantek, Ulu Sg. Silantek kiri, 300 m. Anambas & Natuna Islands: Bunguran, G. Ranai, 400 - 1000 m.

Ecology: On sandstone rocks, rocky banks and rocky streams in Dipterocarp forest.

Notes: *R. ornata* is the lectotype of sect. *Stilpnothrix* (BURTT 1954). The species is easily recognized by the following characters: long, lanceolate (sometimes falcate) leaves in a dense tuft at the end of an erect, woody stem; long whitish hairs all over; campanulate, pale blue flowers.

The two specimens collected on Gunung Santubong (BURTT & WOODS B. 1982, ANDERSON S. 25965) differ in slender stems (up to 25 cm long, 0,3 cm in diam) and narrow leaves (up to 12.5 x 1 cm) with lateral veins barely visible on either surface (the veins are usually well marked and slightly raised on the lower surface). Flowers of this form are not yet known; the fruit is 1.5 cm long.

Specimens: ANDERSON 4 (K). - ANDERSON S. 25965 (SAR). - BECCARI 1889 (type). - BREMER 1658 (L). - BROOKE 9499 (BM, L). - BROOKE 9754 (BM, L). - BURTT & WOODS B. 1945 (E). - BURTT & WOODS B.1982 (E). - BURTT & WOODS B. 2505 (E). - CHING S. 42153 (L, SAR, E, K, KEP). - CLEMENS & CLEMENS 20981 (BO, K, SAR, Z). - LOBB (K; syntype). - Native coll. E 242 (E, SAR). - Native coll. E 245 (E, SAR). - Museum coll. s.n., 24. XI 1909, (SAR). - RIDLEY 12311 (BM). - RIDLEY s.n., I. 1915 (BM). - PAIE S. 42552 (A, E, K, L, SAN, SAR). - STEENIS 1404 (BO, K).



W.H. Fitch lith.

Hanhart imp.

Didissandra ornata, C.B. Clarke.

Fig. 10. *Ridleyandra ornata*, reproduced from CLARKE 1883, t. 8.

23. *Ridleyandra rufa* (C. B. Clarke) B. L. Burt, comb. nov.

≡ *Didissandra rufa* C. B. Clarke in A. DC., Monogr. phan. 5/1: 70 (1883); B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 24: 42 (1962); B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 31: 40 (1971); B. L. Burt, Notes Roy. Bot. Gard. Edinburgh 35: 370, 373 (1977).

= *Didymocarpus papillosus* Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 86 (1927) - [BURTT 1962].

= ? *Didymocarpus consobrinus* Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 86 (1927) - [BURTT 1962].

Type: W. Borneo, Landak, TEYSMANN 11211 (holo FI, photo E; 4 iso BO).

Etymology: The epithet refers to the long rufous hairs on stem and leaves.

Description: Stem very short, lignescent; stem apex as well as petioles clothed with 5 - 12 mm long, patent, shining, rufous hairs. Leaves: petiole to (1-) 5 - 10 cm long, lamina 8 - 12 x 2 - 4 cm, narrowly ovate, base rounded to slightly cordate, often unequal, apex narrowly acute to shortly acuminate, margin serrate, teeth rather blunt, upper side with sparse long hairs, lower side glabrous except nerves, which are clothed with long rufous hairs. Peduncle 5 - 10 cm, villous to nearly glabrous, bearing a single flower, bracts 2, opposite, c. 5 - 8 mm long, narrow lanceolate, placed 1 - 2 cm below the calyx. Sepals free to base, 3 - 5 mm long, limb flat, nearly 2 cm in diam. upper lip short, lobes c. 3 mm, lower lip cruciately lobed, lobes elongate-rounded, median lobe c. 1 cm, lateral lobes 6 - 7 mm. Stamens 4; filaments arising just above corolla base, 2.5 - 3 mm long, slightly unequal; anthers 2.5 x 2 mm, exposed. Capsule 2 - 3 cm long.

Illustrations: Fig. 11 [herb. specimen, flower of herb. specimen]; SONTAG & WEBER 1998: Fig. 3f [seed].

Distribution: W. and NW Borneo. Kalimantan: Landak; Mt. Glam, 500 m; Bkt. Mulu, 600 - 700 m; Lower Serawai, 85 m; Bkt. Tilung; Sanggau.

Ecology: Shaded sandstone rocks in Dipterocarp forest.

Notes: The plant is well marked by the long-petioled, narrow ovate leaves with long rufous hairs. The corolla has a much shorter tube than *D. ornata*: the limb is flat and the large yellow anthers held at the mouth of the corolla give it a superficial resemblance to the flower of a *Saint-paulia*, though in that genus the lateral lobes of the lower lip are never so widely spreading as to reach the cruciate position found in *R. rufa*.



Fig. 11. a *R. rufa* (ELSENER 240, E), b close-up of flower (ELSENER 240, L).

The synonymy of *Didymocarpus consobrinus* with *R. rufa* is still doubtful (BURTT 1962); it differs in having rather thicker narrower leaves (up to 8 x 1.5 cm), pale below with the lateral nerves scarcely visible. KRAENZLIN also called attention to the absence of bracts. It has only been collected once.

Specimens: ELSENER 240 (BO, E, K, L). - HALLIER 2372 (BO). - LANGGLASSÉ 55, 63 (P). - TEYSMANN 11211 (type). - WINKLER 475 (HBG, photo E; BO; type of *Didymocarpus papillosus*). - WINKLER 274 (BO, E, HBG [2]). - WINKLER 1477 (HBG, photo E; type of *Didymocarpus consobrinus*).

Excluded species

Didissandra breviflora Ridl.

This species has been transferred to *Didymocarpus* by KIEW & WEBER (1988). By the redefinition of that genus, another transfer, to *Henckelia*, is required. This is made in WEBER & BURTT 1998b.

Acknowledgments

The authors are indebted to Mag. SUSANNE SONTAG, Mag. DAGMAR HADL, Mrs. MONIKA PASCHINGER and Dr. RALF BUCHNER for technical assistance. Prof. M. H. BOKHARI (Multan) kindly provided unpublished information on fruit structure in *Ridleyandra ornata*. The first author acknowledges support from the Austrian "Fonds zur Förderung der wissenschaftlichen Forschung" (project numbers P 8166-B, P 6969-B and P 7984-BIO).

References

- BARNETT, E. C.: Contributions to the Flora of Thailand. LV. - Kew Bull. 15: 249 - 259 (1961).
- BURTT, B. L.: Studies in the Gesneriaceae of the Old World. XX. Miscellaneous notes. - Notes Roy. Bot. Gard. Edinburgh 23: 94 - 128 (1960).
- Id. XXII. Miscellaneous transfers and new species. - Notes Roy. Bot. Gard. Edinburgh 24: 41 - 49 (1962).
- Id. XXXIV. A miscellany from South Eastern Asia. - Notes Roy. Bot. Gard. Edinburgh 31: 35 - 52 (1971).
- New species of phytogeographical interest in *Beccarinda* and *Henckelia* (Gesneriaceae). - Beitr. Biol. Pflanzen 70: 377 - 382 (1998).
- DAFNI, A., Y. IVRY & N. B. M. BRANTJES: Pollination of *Serapias vomeracea* Briq. (Orchidaceae) by imitation of holes for sleeping solitary male bees (Hymenoptera). - Acta Bot. Neerl. 30: 69 - 73 (1981).
- HENDERSON, M. R.: Malayan Wild Flowers. Dicotyledons. Reprint: Kuala Lumpur: Malayan Nature Society (1950) (reimp. 1974).
- KIEHN, M., E. HELLMAYR & A. WEBER: Chromosome numbers in Malayan and other paleotropical Gesneriaceae. I. The tribe Didymocarpeae. - Beitr. Biol. Pflanzen 70: 407 - 444 (1998).
- KIEW, R. & A. WEBER: Two new species (*Didissandra porphyrantha*) and a new combination (*Didymocarpus breviflorus*), Gesneriaceae, from Selangor, Malaysia. - Gard. Bull. Singapore 41: 1 - 9 (1988).
- LUEGMAYR, E.: Untersuchungen zur Morphologie und systematischen Bedeutung des Pollens paläotropischer Gesneriaceen. - Unpubl. Diploma-thesis, Univ. Vienna (1989).
- Pollen characters in Old World Gesneriaceae (Cyrtandroideae), with special reference to SE Asian taxa. - Grana 32: 221 - 232 (1993).

- NARAYANASWAMI, V.: Provenance of early Malayan plant collections. - J. & Proc. Asiat. Soc. Bengal 27: 327 - 477 (1931).
- PAULUS, H. F. & C. GACK: Schlafplatzmimikry bei der mediterranen Orchidee *Ophrys helenae*. - Verh. Deutsch. Zool. Ges. 86 (1): 267 (1993).
- RIDLEY, H. N.: Cyrtandraceae Malayenses. - J. Linn. Soc. Bot. 32: 497 - 528 (1896).
- The Gesneriaceae of the Malay Peninsula. - J. Straits Branch Roy. Asiat. Soc. 44: 1 - 92 (1905).
- Gesneriaceae. - In: KING, G. & GAMBLE, J.S.: Materials for a flora of the Malayan Peninsula. - J. Asiat. Soc. Bengal 74 (2), extra no.: 729 - 908 (1909).
- The flora of the Malay Peninsula. II. - London: Reeve & Co (1923).
- SONTAG, S. & A. WEBER: Seed coat structure in *Didissandra*, *Ridleyandra* and *Raphiocarpus*. - Beitr. Biol. Pflanzen 70: 179 - 190 (1998).
- VAN STEENIS-KRUSEMAN, M. J.: Malaysian plant collectors and collections. Flora Malesiana ser. 1, 1. - Djakarta: Noordhoff-Kolff (now Martinus Nijhoff Publishers). Reprint: Koenigstein: Koeltz (1950) (reimp. 1985).
- WEBER, A. & B. L. BURTT: *Didissandra* - redefinition and partition of an artificial genus of Gesneriaceae. - Beitr. Biol. Pflanzen 70: 153 - 177 (1998a).
- Remodelling of *Didymocarpus* and associated genera (Gesneriaceae). - Beitr. Biol. Pflanzen 70: 293 - 363 (1998b).
- & R. KIEW: Gesneriads of Peninsular Malaysia. - Nature Malaysiana 8(3): 24 - 31 (1984).

Addresses of the authors:

A. WEBER

Institute of Botany, University of Vienna
Rennweg 14
A-1030 Vienna
Austria

B. L. BURTT

Royal Botanic Garden
Edinburgh EH3 5LR
Scotland, U. K.