

**NOTES ON MALESIAN FABACEAE
(LEGUMINOSAE–PAPILIONOIDEAE)
10. The genus *Alysicarpus***

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SUMMARY

Alysicarpus Desv. is revised for the Flora Malesiana area. The recently described species *A. aurantiacus* Pedley is recorded for several localities in Papua New Guinea. *Alysicarpus monilifer* L. is recorded for Luzon (Philippines). The variability of *A. vaginalis* is discussed. A key for the Malesian species is presented.

Key words: *Alysicarpus*, Malesia, Papua New Guinea.

INTRODUCTION

Alysicarpus Desv. is a small genus of 30 species of desmodioid Leguminosae widespread in tropical Africa and Asia. In Malesia five species are found. Many species prefer a seasonal climate with at least a short dry period. As in other genera of the tribe Desmodieae most species of *Alysicarpus* have hooked hairs on several organs and the pods are usually lomentaceous.

Several specimens of the recently described *A. aurantiacus* Pedley (Pedley, 2001) were found. The species is described below.

One specimen collected in the Philippines is similar to *A. monilifer* L. from Africa and India and to *A. yunnanensis* Y.C. Yang & P.H. Huang from Yunnan, China.

The most common species *A. vaginalis* (L.) DC. proved to be extremely variable.

A key to the species in the Flora Malesiana region is provided.

***Alysicarpus aurantiacus* Pedley — Fig. 1a–i**

Alysicarpus aurantiacus Pedley (2001) 109. — Type: *Pedley 4588* (holo BRI; iso MEL), Australia, Queensland, North Kennedy District, 45 km S of Townsville.

Alysicarpus vaginalis auct. non (L.) DC.: Benth. (1864); Verdc. (1979, pp.).

Erect to decumbent herbs or dwarf shrubs, up to 60 cm high. Twigs terete, 0.5–1 mm diam., with hooked and appressed longer straight hairs, usually in a line below the leaves to \pm all around. *Stipules* elliptic to triangular, often with a small lobe opposite the insertion of the leaf, 3–18 by 1.5–2 cm, both sides glabrous, margin ciliate with long straight hairs at least in the upper part. *Petiole* 3.5–8 mm long, grooved, glabrous or with few straight hairs along the margin of the groove; pulvinus 0.5–1 mm long.

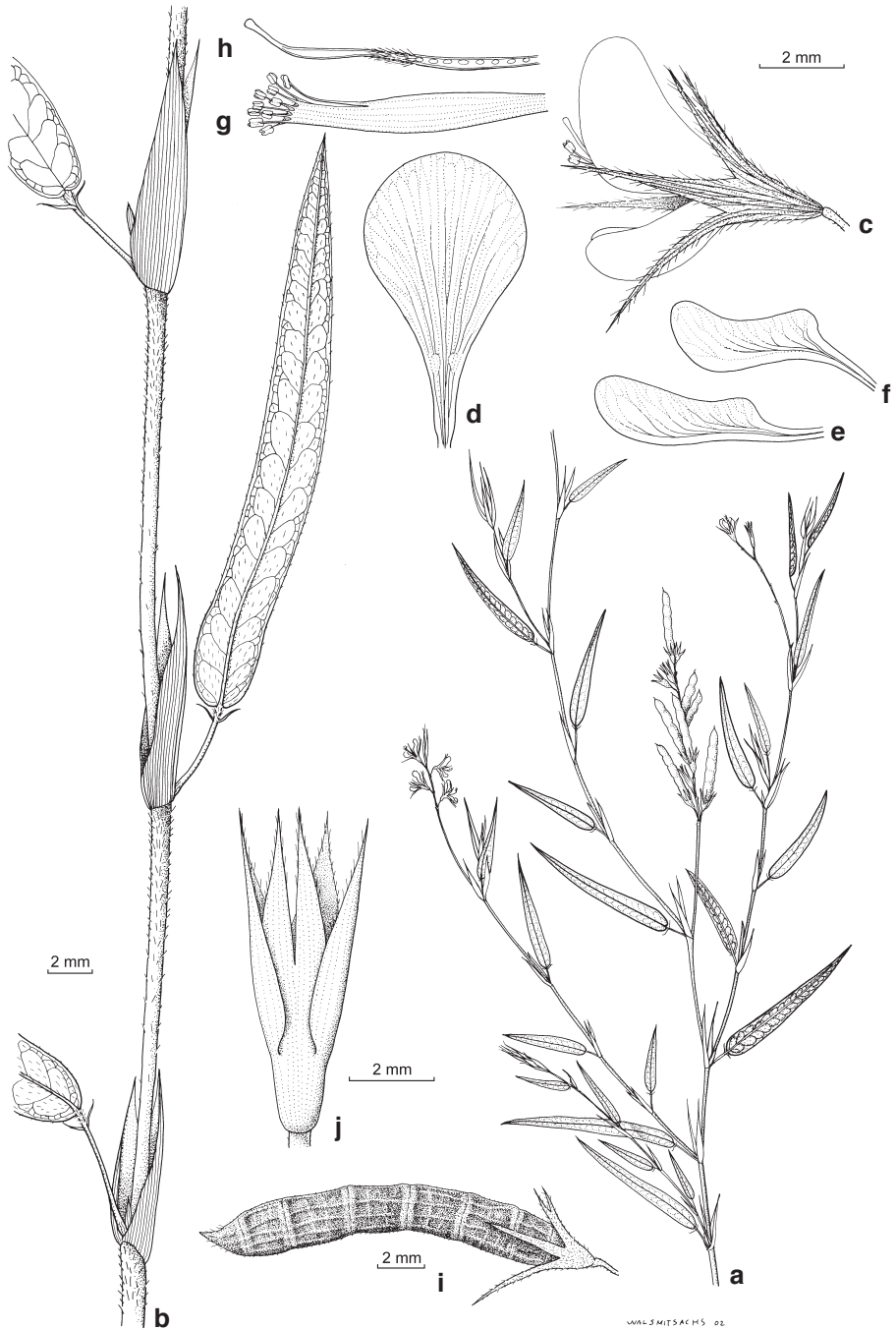


Fig. 1. Habit, flower (parts) and pods of *Alysicarpus* species. — a–i: *Alysicarpus aurantiacus* Pedley. a. Habit; b. part of stem; c. flower; d. standard; e. wing; f. keel petal; g. stamens; h. pistil; i. pod. — j: *Alysicarpus bupleurifolius* (L.) DC., calyx (a–i: NGF 22079; j: Backer 36817).

Stipellae acicular to narrowly triangular, 0.5–3 mm long, glabrous or with some straight hairs. *Leaflets* elliptic or ovate to linear, 7–55 by 3–5.5 mm, index 2.2–19, base cordate, apex obtuse to acute, apiculate, above glabrous, rarely with few appressed straight hairs, below (thinly) strigose-hirsute, with hooked hairs and longer appressed straight hairs, midrib above flat, nerves slightly raised above, 6–36 per side, 0.5–4 mm apart, venation ± reticulate; pulvinus 0.5–1 mm long. *Inflorescences* axillary or terminal, 20–55 mm long, peduncle (0–)10–45 mm long, with hooked hairs and appressed straight hairs, peduncle often glabrous at the base. *Bracts* to the brachyblasts ovate to triangular, 3.5–7 by 1.5–2 mm, acute to acuminate, acumen up to 2 mm long, outside hirsute with hooked hairs and thin straight hairs at least at the base, margin with long straight hairs, inside glabrous. *Bracts* to the flowers elliptic, 2–3 by 0.5–0.7 mm, obtuse to acute, indumentum same as bracts to the brachyblasts. *Pedicels* 1–2 mm long, hirsute with hooked hairs and thin straight hairs. *Calyx* 5–6 mm long, tube 1.5–2 mm long; lobes not imbricate; upper lip ovate 3–4 by 1–1.5 mm, teeth 1–1.5 mm long; lateral lobes narrowly ovate, 3.5–4 by 1 mm, median lobe narrowly ovate, 3.5–4.3 by 0.75–1 mm; outside hirsute with hooked hairs and thin straight hairs, the upper part of the tube (mostly at the base of the lobes) also with longer appressed straight hairs, lobes ciliate by straight hairs, inside very thinly hirsute with hooked hairs and thin straight hairs. Corolla yellow to orange, rarely changing to purple on opening. *Standard*: claw c. 0.5 mm long; blade obovate, 5–7 by 3–5 mm, rounded or ± emarginate, with 2 laminal callosities, both sides glabrous. *Wings*: claw 1–1.5 mm long; blade ± obliquely elliptic, 3–5 by 1–2 mm, rounded, auricles inconspicuous, both sides glabrous. *Keel petals*: claw 2–2.5 mm long; blade ± boat-shaped, usually bent and folded, 3.5–4.5 by 1–1.5 mm, rounded, lateral pocket inconspicuous, both sides glabrous. *Stamens* 6–7 mm long, free part of filaments 0.5–1 mm long, glabrous; free stamen 5–6.5 mm long; anthers 0.4 by 0.4 mm, glabrous. *Ovary* 3–3.5 mm long, hirsute with hooked hairs and thin straight hairs, at apex also with longer appressed straight hairs; ovules 5–8; style 3–4 mm long, usually bent at 3/4, at the base with appressed straight hairs, rarely also with hooked hairs. *Pods* ± flattened cylindrical, 14–20 by 2–2.5 mm, not constricted between the loments; loments not septate, rarely the lowest one septate, ± barrel-shaped, 2–3 by 2–2.5 mm; valves hirsute with hooked hairs and thin straight hairs, apical loment also with appressed straight hairs. *Seeds* rectangular or bean-shaped, 1.8–2.1 by 0.9–1.5 by 0.5–0.7 mm; hilum 0.2 mm long.

Distribution — Papua New Guinea (Central, Gulf, Milne Bay, Morobe Provinces); Australia (Queensland).

Habitat & Ecology — Savannah grassland and forests, along roads. Altitude up to 160 m. Flowering and fruiting: February to August, November, December.

Note — The specimens of *A. aurantiacus* are superficially similar to narrow-leaved forms of *A. vaginalis* and in some characters similar to *A. bupleurifolius* (Table 1). Often the indumentum of the stems is more like that of *A. bupleurifolius*. Also the flower colour (orange or yellow) is like that of *A. bupleurifolius*. In calyx (Fig. 1c) and fruit (Fig. 1i) characters *A. aurantiacus* is similar to *A. vaginalis*. *Alysicarpus aurantiacus* differs from *A. bupleurifolius* in the non-overlapping calyx lobes (compare Fig. 1c and 1j) and in the fruits: not constricted between the loments in *A. aurantiacus* (Fig. 1i), constricted between the loments in *A. bupleurifolius* (Fig. 2c).

Table 1. Differences between *Alysicarpus bupleurifolius* (L.) DC., *Alysicarpus aurantiacus* Pedley and *Alysicarpus vaginalis* (L.) DC.

	<i>bupleurifolius</i>	<i>aurantiacus</i>	<i>vaginalis</i>
indumentum twigs	appressed straight hairs in a line below the leaves, rarely also with hooked hairs	appressed straight hairs in a line below the leaves, also hooked hairs, rarely hairs tending to be scattered all over	glabrous or with hooked hairs and patent straight hairs, rarely with appressed straight hairs, hairs usually scattered all over, rarely in a line below the leaves
size of leaflets	5–75 by 1–8 mm	7–55 by 2–6 mm	5–53 by 4–27 mm
ratio l by w	1.3–30	2.2–19	1.1–11.5
calyx lobes	imbricate	not imbricate	not imbricate
corolla	yellow or orange, rarely pinkish	yellow or orange, rarely changing to purple on opening	purplish or reddish, wing and keel petals sometimes lighter
Pods	slightly constricted between the loments, septate	not constricted between the loments, not septate	not constricted between the loments, septate or not
loments	clearly separated, smooth or obscurely veined, glabrous	scarcely separated, ± veined, thinly to densely set with hooked hairs, at apex also with appressed straight hairs	scarcely separated, obscurely to clearly veined, glabrous to densely set with hooked hairs, at apex also with appressed straight hairs

ALYSICARPUS MONILIFER AND ALYSICARPUS YUNNANENSIS

A fruiting specimen collected by M.S. Clemens in Luzon, the Philippines (*M.S. Clemens 17871*, SING, Fig. 2j) is in all characters very similar to *A. monilifer* L. and *A. yunnanensis* Y.C. Yang & P.H. Huang. These two species differ from most other *Alysicarpus* species in their moniliform pods: clearly constricted between the bead-like loments. The Clemens specimen, *A. monilifer* and *A. yunnanensis* are very similar in vegetative and flower characters. *Alysicarpus monilifer* and *A. yunnanensis* differ only in the pods: the loments in *A. monilifer* are obscurely to distinctly veined, while in *A. yunnanensis* they are smooth. The few pods of *M.S. Clemens 17871* are more or less transitional between those of the two species mentioned above: the loments are obscurely veined to smooth. Study of more material of *A. monilifer* and *A. yunnanensis* may show that the differences are insufficient to keep both species separate. For the moment *M.S. Clemens 17871* is included in *A. monilifer*. There is, however, one complication: the upper right hand specimen of the SING sheet and the duplicate from Berkeley (UC) have different pods and belong to *A. vaginalis*.

ALYSICARPUS OVALIFOLIUS AND ALYSICARPUS VAGINALIS

Endo & Ohashi (1990) discussed differences between *A. ovalifolius* (Schumach.) J. Léonard and *A. vaginalis*. They paid most attention to the pods, especially to the

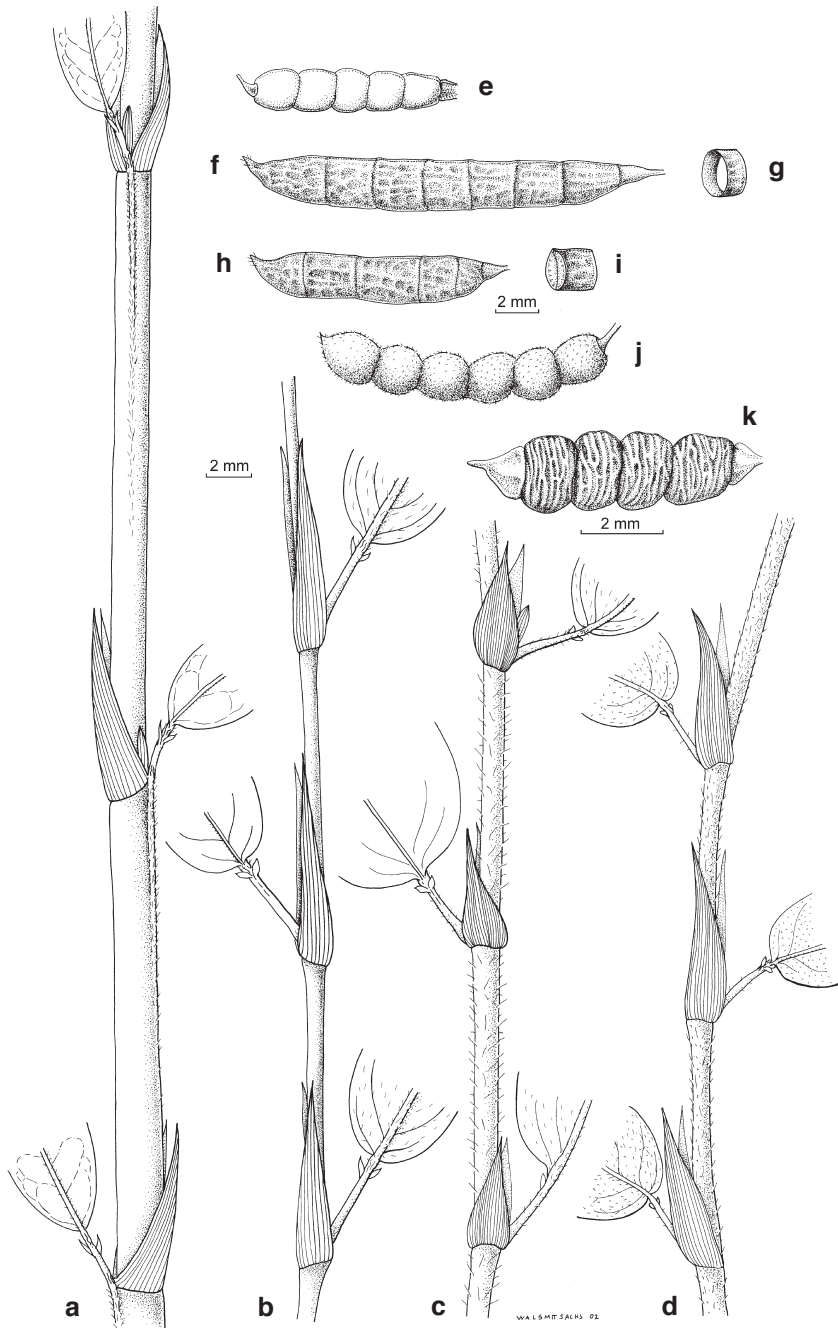


Fig. 2. Stems (a–d), pods (e, f, h, j, k) and loments (g, i) of *Alysicarpus* species. — a, e: *A. bupleurifolius* (L.) DC. — b–d, f–i: *A. vaginalis* (L.) DC. — j: *A. monilifer* L. — k: *A. rugosus* (Willd.) DC. (a, e: Backer 36817; b, f, g: Meijer 5393; c, h, i: PNH 1499; d: Elbert 4684; j: Clemens 17871b; k: Dorgelo 23).

presence or absence of septa. In their description the pods of *A. ovalifolius* have no septa and the loments break off with some difficulty, while the pods of *A. vaginalis* are septate, with loments that break off readily (Fig. 2f–i). They suppose that these differences may indicate different modes of dispersal.

In the Malesian material these characters were studied in some detail with the following results: \pm half of the specimens have septa in the pods, the other specimens have no septa. However, in most ‘non-septate’ specimens the upper 1 to 4 or 5 loments of a pod may have septa, while the lower loments are not septate (see also Endo & Ohashi, 1990). It is possible to arrange the Malesian material in a sequence from specimens having pods with septa in all loments to those with none of the loments septate. Other observations on the occurrence of septa are that in loments which are not septate almost always a narrow ring is visible located at the place of the absent septum. In loments with septa these are sometimes not fully closed and a small central opening may be present. As far as can be observed from the dried material septa seem to develop late and may be ‘overrun’ by the development of the pod.

Léonard (1954) gives another difference between *A. ovalifolius* and *A. vaginalis*: *Alysicarpus ovalifolius* has an open inflorescence with the flowers shorter than the internodes; while *A. vaginalis* has a more dense inflorescence with the flowers longer than the internodes. Endo & Ohashi (1990) observed the same differences in the material they studied. In the Malesian material only a small percentage of the plants have a more open inflorescence with flowers shorter than the internodes (c. 33% of the non-septate plants and c. 16% of the total number). Of the ‘septate’ plants only 2 specimens have flowers shorter than the internodes. In several specimens only the lower flowers are shorter than the internodes, the upper ones being longer than the internodes. Furthermore, there are several specimens with inflorescences in which the internodes are alternately shorter and longer, the short ones being barely as long as the pedicels of the flowers.

I have studied c. 200 specimens from the herbaria A, BO, L, LAE, PNH, SING, UC and WAG and concluded that *A. vaginalis* is a very variable species. Variability was found in: the indumentum of twigs, which are glabrous or with scattered patent straight hairs, or with scattered hooked hairs, or with scattered hooked and appressed straight hairs, rarely tending to be restricted to one line below each leaf (Fig. 2b–d); shape of the leaves; the density of the flowers in the inflorescence; size of the flowers; the pods which are variable in indumentum, venation and presence or absence of septa (Fig. 2f–i). No combination of characters made it possible to divide the Malesian material in two or more distinct taxa. My conclusion is that in Asia only one very variable species is present: *Alysicarpus vaginalis* (L.) DC. I have some doubts whether it is possible to distinguish *A. ovalifolius* elsewhere in the world, as already Verdcourt (1971) said that in tropical Africa the distinction between *A. ovalifolius* and *A. vaginalis* is very unsatisfactory: “All Zanzibar material seems to be intermediate”.

KEY TO THE SPECIES OF ALYSICARPUS IN MALESIA

- 1a. Calyx lobes (strongly) imbricate at the base. — Twigs with a line of appressed straight hairs below each leaf, rarely also with hooked hairs (Fig. 2a) 2
- b. Calyx lobes not or scarcely imbricate 3

- 2a. Ovary glabrous. Pods glabrous, loments \pm barrel-shaped, smooth or obscurely veined (Fig. 2e) **2. *A. bupleurifolius***
- b. Ovary at least in upper part with hooked hairs. Pods in upper part with hooked hairs; loments broadly heart-shaped to \pm barrel-shaped, strongly transversely veined (Fig. 2k) **4. *A. rugosus***
- 3a. Leaflets linear ovate to broadly elliptic or broadly obovate, 5–55 by 3–27 mm. Pods flattened cylindrical, not constricted between the loments, loments \pm barrel-shaped 4
- b. Leaflets broadly obovate, 2–8 by 2–7.5 mm. Pods moniliform, distinctly constricted between the loments, loments flattened globular or discoid **3. *A. monilifer***
- 4a. Stems with hooked hairs and longer appressed straight hairs usually in a line below the leaves, rarely scattered. Flowers yellow to orange, rarely changing to purple on opening **1. *A. aurantiacus***
- b. Stems glabrous, or with long patent straight hairs, or with hooked hairs, or with hooked hairs and longer patent straight hairs, rarely with hooked and appressed hairs, hairs usually scattered, rarely tending to be in one line below each leaf. Flowers reddish or purplish, wings and keel petals sometimes creamish **5. *A. vaginalis***

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IDENTIFICATION LIST

1 = *A. aurantiacus*; 2 = *A. bupleurifolius*; 3 = *A. monilifer*; 4 = *A. rugosus*; 5 = *A. vaginalis*

- Afriastini 1619: 5 — Amir 153: 5 — Anta 275: 5 — Aquilar 966: 2; 967: 5; 968: 5 — Asdat 98: 5.
- Backer 2559: 4; 2735: 2; 6601: 5; 7696: 2; 7722: 5; 8300: 4; 19451: 2; 19626: 5; 19778: 4; 20087: 2; 26550: 2; 26643: 2; 27762: 2; 36817: 2 — Bakhuizen van den Brink Jr. 970: 5 — Bartlett & La Rue 175: 5 — Bell 27: 1; 43: 5 — Bloembergen 3008: 5; 3847: 5 — Blume 763: 5; 1145: 5 — BNBFD 5445 (Leano): 5 — Boerlage 28: 5; 239: 5; 300: 2 — Brass 8783: 1; 29378: 5 — BS 1969 (Ramos): 5; 2039 (Ramos): 2; 3735 (Fenix): 5; 11940 (Robinson & Ramos): 2; 12206 (Ramos): 5; 19168 (Reillo): 5; 19174 (Reillo): 2; 22267 (Ramos): 5; 22417 (Ramos): 5; 44589 (Ramos & Edaño): 2; 44661 (Ramos & Edaño): 5 — Bunnemeijer 10690: 5; 11158: 2 — Burkill 1282: 2 — Buwalda 2918: 5; 4839: 5; 5974: 5; 7160: 5 — BW 5234 (Iwanggin): 5.

- Carr 11137: 1; 11187: 5; 11410: 5; 11891: 1; 11892: 5 — Clason 870: 5 — Clemens 17672: 2; 17871: 5; 17871b: 3; 18048: 5; 40766: 5 — Coert 73: 5; 273: 5; 332: 5; 512: 5; 525: 4; 573: 2; 1685: 5; 1691: 5; 1763: 5; 1778: 5; 1789: 5 — Craven & Schodde 896: 1 — Cuming 662: 5; 1317: 5; 1616: 2 — Curtis 1893: 5.
- Danser 6334: 5; 6479: 5 — Darbyshire 596: 1; 643: 5 — De Voogd 800: 5; 801: 4; 1864: 2; 2055: 4; 2114: 5; 2435: 4; 2723: 4 — De Wilde & De Wilde-Duyfjes 12767: 5; 12768: 5 — Dilmy 1044: 4 — Dissing 2515: 5 — Dorgelo 23: 4; 132: 5; 356: 5; 379: 2; 1629: 5; 1652: 5; 2008: 2.
- Ebalo 279: 5 — Elbert 4367: 5; 4684: 5 — Elmer 11119: 2; 13515: 5.
- Gibbs 6285: 5 — Goetghebeur & Coppejans 3440: 5; 3479: 5 — Goetghebeur & Vyverman 6137: 5.
- Hallier 84b: 5; 85: 5 — Hartley 10266: 5; 11619: 5 — Herb. Boschproefstation 3154: 2 — Heyligers 1217: 1 — Hochreutiner 1117: 5 — Holstvoogd 17: 5 — Hoogland 4676: 1; 5096: 5 — Horsfield L60: 2; L61: 2.
- Iboet 485: 5 — Iwatsuki, Murata & Gutierrez P-1: 5.
- Jaag 833: 5 — Jacobs 4987: 2 — Jaheri 281: 2; 282: 5 — Jensen 50: 5; 227: 5 — Jeswiet 150: 4; 170: 4; 238: 5; 1162: 5; 1861: 5; 1973: 5 — Junghuhn 66: 5; 166: 5; 174: 5.
- Kieviets 1732: 5 — Kingston 145: 2 — Kjellberg 794: 5; 4086: 2 — Klein Hoonte 158: 5; 309: 5; 365: 5 — Kooy 44: 5; 92: 5; 677: 2; 726: 5 — Kornassi 7: 5; 1109: 5 — Kostermans 22009: 5 — Kostermans & Wirawan 157: 2 — Kreulen 124: 5 — Kuhl & Van Hasselt 80: 5 — Kulescha 'Pekalongan' 29: 5.
- LAE 51652 (Streimann & Kairo): 1; 60309 (Foreman et al.): 5; 70390 (Wiakabu et al.): 5; 70394 (Wiakabu et al.): 5 — Larsen 372: 5; 1517: 5; 5196: 5 — Loeters 1214: 5; 1246: 5 — Lörzing 6186: 5.
- Meijer 5593: 5; 10371: 4 — Meijer & Noerta 8098: 5 — Merrill 65: 5; 3091: 5 — Monod de Froideville 7: 2; 49: 5; 405: 5; 479: 2; 610: 5.
- Nedi 90: 5; 540: 5 — NGF 2679 (Bridgeland): 5; 3160 (Womersley): 5; 4027 (Fryar): 5; 11510 (Henty): 5; 16672 (Henty): 1; 22023 (Gillison): 2; 22025 (Gillison): 5; 22029 (Gillison): 1; 22033 (Gillison): 5; 22038 (Gillison): 1; 22039 (Gillison): 5; 22071 (Gillison): 5; 22079 (Gillison & Buderus): 1; 22113 (Gillison): 5; 22185 (Gillison): 1; 27882 (Streimann & Kairo): 5; 29584 (Coode & Croyley): 5; 39367 (Streimann): 5; 44009 (Streimann & Kairo): 5 — NIFS 6743: 2 — Noerkas 30: 5; 107: 2 — Nur 34125: 5.
- Pedley 4588: 1 — PNH 3110 (Mendoza): 5; 3770 (Edaño): 5; 4088 (Edaño): 5; 5008 (Fox): 5; 5976 (Alcaacid): 5; 8252 (Sulit): 5; 8474 (Sulit): 5; 8475 (Sulit): 5; 8476 (Sulit): 5; 14999 (Animal Industry Employee): 5; 17073 (Sulit): 5; 17075 (Sulit): 5; 17978 (Edaño): 5; 22072 (Aligaen): 5; 22613 (Steiner): 5; 34103 (Steiner): 5; 34755 (Steiner): 5; 35135 (Frohne): 5; 40254 (Edaño): 5; 42001 (Mendoza): 5; 91864 (Farinas): 5; 92083 (Villamor): 5 — Popta 728: 5; 778: 4 — Powell 305: 5 — Pringo Atmodjo 97: 5 — Pullen 1739: 5; 6674: 1.
- Raap 36: 5; 601: 5 — Rahmat si Toroes (= Rahmat si Boeea) 1084: 5 — Ramirez 4: 5 — Ramlanto 456: 5 — Rappard 74-8: 5; 74bis-8: 5; 136: 2; 152: 2; 227: 4; 270: 5 — Raynal 16643: 5 — Ridley 8008: 5; 15156: 5 — Robinson 2034: 5 — Rogerson 1076: 5.
- Sandermark Olsen & Hansen 90: 5 — Santos 4487: 5; 4864: 2; 6129: 5; 6191: 5 — Sauveur 1178: 5 — Schiffner 2042: 5; 2063: 5 — Schimper 9: 5; 11: 5 — Schmutz 36: 2; 2119: 5; 4192: 5 — SF 2772: 5; 3421 (Haniff): 5; 34423 (Nur): 5 — Soegangdiredjo 107: 5 — Siti Sunarti & Prawiroatmodjo 3: 5; 16: 5.
- Teijsmann HB 10706: 5 — Togashi 621323: 5.
- UPNG 37 (Pulsford): 2; 46 (Pulsford): 1; 332 (Tipett): 1; 391 (Gebo): 5; 1344: 2; 4274 (Frodin et al.): 1; 5210 (Frodin): 2; 5231 (Frodin): 5; 8561 (Pumina): 5.
- Van der Meer & Den Hoed 2010: 5 — Van Niel 3468: 5; 3822: 5 — Van Oostroom 13598: 5; 13740: 5 — Van Royen 3796: 5; 4532: 5 — Van Royen & Sleumer 5648: 5; 6583: 5 — Van Slooten 2421: 2 — Van Steenis 7512: 5; 7514: 2; 12522: 5; 12531: 2; 12744: 2; 17882: 5; 18103: 5 — Van Zanten H8: 5; H13: 5 — Verdcourt & Huxley 4879: 1; 4880: 5; 4883: 1; 4886: 2 — Verheijen 2393: 5; 2485: 5; 3143: 5 — Vesterdal 248: 5 — Vidal 2649: 5.
- Walsh 71: 5; 225: 2 — Wenzel 562: 5; 1679: 5 — Widjaja 4684: 5 — Wiradinata 2951: 5; 3012: 2 — Wisse 38: 5 — Worthington 12349: 5.
- Zippelius 76b: 5; 76c: 2 — Zollinger 36: 5; 633: 5; 2352: 2; 2353: 4.