



Fig. 1. *Rivinia humilis* L. Habit, nat. size, a. bud, b. flower, c-d. stamen, e. young fruit, f. fruit, g. seed (a-b $\times 4$, c-e $\times 5$, f-g $\times 2\frac{1}{2}$).

PHYTOLACCACEAE (C. A. Backer, Heemstede)

Herbs, shrubs or (not in Malaysia) trees. *Leaves* alternate, simple, entire; stipules minute or absent. *Flowers* in terminal, axillary or lateral racemes, bracteate and bibracteolate, ♀ or unisexual, actinomorphic or zygomorphic, mostly (so in the Malaysian species) monochlamydeous. *Tepals* 4–5, herbaceous or membranaceous, free, imbricate in bud, coloured during and often also after anthesis, equal or unequal, persistent. *Stamens* 3 to many, usually inserted on a hypogynous disk, either regularly or irregularly arranged, 1–2-seriate; those of the only or outer series more or less alternating with the tepals; filaments slender, free, persistent; anthers dorsi- or basifixed, dehiscing longitudinally. Ovary superior, composed of 1 or more carpels; these either free or laterally connate. Styles as many as carpels, short, or none, free. Ovules solitary in each carpel, basal. *Fruit* of 1 or more carpels, juicy or dry. Seed erect; embryo large, peripheric, enclosing the endosperm.

Distr. Genera upwards of 20, mostly inhabitants of the tropics of both hemispheres, mainly of America. In Malaysia 3 herbaceous or subshrubby genera, all introduced from tropical America.

Ecol. The Malaysian species inhabit anthropogenic localities: open jungles, forest-borders, roadsides, waste places.

Uses. None of any importance.

KEY TO THE GENERA

1. Tepals in all flowers 5. Styles 5–10. Fruit a juicy, 5–10-seeded, black or dark red berry 3. *Phytolacca*
1. Tepals in all flowers 4. Style 1 or none. Fruit 1-seeded.
2. Flowers actinomorphic. Ovary glabrous. Style short but distinct. Raceme erect 4–10 cm long. Fruit a juicy unarmed berry, bright red. Bruised leaves not smelling of onions 1. *Rivinia*
2. Flowers zygomorphic. Ovary densely pubescent. Style none; stigma consisting of many hairs. Raceme nodding at the top, usually more than 10 cm long when adult. Fruit dry with 4 apical, reflexed, very sharp spines. Bruised leaves smelling of onions- 2. *Petiveria*

1. RIVINIA

LINNÉ, Sp.Pl. (1753) 121; Gen. Pl. ed. 5 (1754) no 150.

Erect slender herbs, often woody at the base. *Leaves* on longish petioles, exstipulate, ovate-oblong or ovate-lanceolate, long-acuminate, acute, herbaceous. *Flowers* ♀, in terminal and pseudolateral, erect or erecto-patent, often somewhat flexuous, rather lax racemes. Pedicels slender, minutely bibracteolate above the middle or near the top. *Tepals* 4, subequal, during anthesis patent or ± reflexed, white or pinkish, after anthesis slightly accrescent, turning green, at first conniving, finally often spreading or reflexed. *Stamens* 4, alternating with the tepals, shorter than these; anthers dorsifixed, bifid at both ends, glabrous. Ovary unicarpellate, subglobose, glabrous. Style short, decurved after anthesis; stigma capitate. *Fruit* a globose, 1-seeded berry. Seed lenticular, glabrous or shortly hairy.

Distr. Species 3¹, closely allied, native in tropical America; one of these naturalized in Madagascar, Réunion, Ceylon, tropical SE. Asia and Malaysia.

1. *Rivinia humilis* LINNÉ, Sp. Pl. (1753) 121; LAMK, Ill. (1791) t. 81, f. 1; Bot. Mag. (1816) t. 1781; MOQ. in DC. Prod. 13, 2 (1849) 13; EDELING, Nat. Tijds. N.I. 31 (1870) 336; SCHMIDT in MART. Fl. Bras. 14, 2 (1872) 336; WALTER, Pfl. R. 39 (1909) 102 incl. *var. glabra* (L.) WALT.; BACK. Ann. J.B.B. Suppl. 3 (1909) 412; KOORD. Exk. Fl. 2 (1912) 205; MERR. Philip. J.Sc. 11 (1916) Bot. 270, incl. *var. orientalis* (MOQ.) H. WALT.; MERR. En. Philip. 2 (1923) 135;

WILSON, Addisonia 12 (1927) 51, 1 pl.; FURTADO, Gard. Bull. S. S. 4 (1929) 415; JOCHEMS, Trop. Natuur 21 (1932) 149, f. 6; BURK. Dict. 2 (1935) 1913; JOSHI, J. Ind. Bot. Soc. 15 (1936) 91 (embr.); BACK. Bekn. Fl. Java em. ed. 4 (1942) fam. 61, p. 2.—*Rivinia laevis* LINNÉ, Mant. 1 (1767) 41; F.-VILL. Nov. App. (1880) 172; CERON, Cat. Pl. Herb. Manila (1882) 137.—*Rivinia orientalis* Moq. in DC. Prod. 13, 2 (1849) 12; ZOLL. Syst. Verz. (1854) 142;

(1) According to HEIMERL in E. & P. ed. 2, 16c (1934) 147, the genus consists of one variable species only.

MIQ. Fl. Ind. Bat. 1, 1 (1858) 1014.—*Tithonia humilis* O.K. Rev. Gen. 2 (1891) 552.—Fig. 1.

Erect herb, not rarely with a woody base, usually repeatedly branched, 40–100 cm, rarely up to 2 m high; stem in the upper part shortly patently pubescent. *Leaves* rather remote, ovate-oblong or ovate-lanceolate, from a very obtuse, rounded or subcordate base, long-acuminate, acute, glabrous above, shortly pubescent on midrib beneath, 4–12 by 1½–4 cm; petiole shortly patently pubescent, 1–3½ cm. *Racemes* erect or erecto-patent, thinly patently short-pubescent, 4–10 cm long (peduncle included), ∞-flowered. Pedicel erecto-patent or widely patent, during anthesis 2–3 mm long, afterwards 3–4 mm. *Tepals* during anthesis white or pinkish, 2–2½ mm long, in fruit 3–3½ mm. *Berry* bright red, 3½–4 mm diam. Seeds moderately densely clothed with patent, short hairs, ± 2 mm diam.

Distr. Native in tropical America, naturalized in Ceylon, Further India &c., in *Malaysia*: Singapore, N. Sumatra, Java, Madura, Philippines, etc. Introduced in Java more than a century ago, at present naturalized throughout the island, 1–450 m.

Ecol. Slightly shaded localities, under hedges, at the foot of walls, open jungles, campong borders, waste places, locally often rather numerous, but not gregarious.

Vern. *Coral-berry*, E.

Note. In the Malay Peninsula the root is said, but not proved, to be very poisonous; a child in Calcutta was poisoned by the berries, the case not being fatal (BURKILL, *l.c.*). Cattle eat the herbage in Australia; it imparts an unpleasant smell and taste to the milk; their excreta also smell of it (C. T. WHITE, Queensl. Agr. J. new ser. 25, 1926, 274).

2. PETIVERIA

LINNÉ, Sp.Pl. (1753) 342; Gen. Pl. ed. 5 (1754) no 417.

Erect undershrubs; stipules subaxillary, subulate, minute. *Leaves* on short or medium-sized petioles, ovate-elliptic-lanceolate, smelling of onions when bruised. *Flowers* ♀, zygomorphic, small. *Racemes* terminal and axillary, erect or nodding at the top. Pedicels very short, bearing 2 minute bracteoles. *Tepals* 4, oblong-linear, during anthesis spreading and yellowish white, afterwards erect, accrescent, turning green, indurating. *Stamens* 4–8 on the base of the perianth and shorter than this, unequal; anthers dorsifixed, linear, with a deeply bifid apex and a slightly 2-lobed base. *Ovary* unicarpellate, oblong, densely pubescent, on the top with 4 or 6 deflexed bristles which afterwards change into short, sharp spines, 1-celled. *Style* absent; stigma lateral on the ventral upper half of the ovary, consisting of many longish hairs. *Fruit* exserted from the enclosing perianth, narrowly cuneiform, compressed, dry, indehiscent; pericarp coriaceous, adhering to the seed. *Seed* linear.

Distr. Species 1 or 2, native in the warmer regions of America, one on a very small scale naturalized in *Java*.

1. *Petiveria alliacea* LINNÉ, Sp. Pl. (1753) 342; GAERTN. Fruct. 1 (1788) 363, t. 75; MOQ. in DC. Prod. 13, 2 (1849) 9; SCHMIDT in MART. Fl. Bras. 14, 2 (1872) 332; WALTER, Pfl. R. 39 (1909) 118; BACKER, Bekn. Fl. Java em. ed. 4 (1942) fam. 61, p. 2.

Erect, ½–1½ m high; stem thin, hairy in the upper part. *Leaves* elliptic-oblong or slightly obovate, from an acute base, with a narrowed or acuminate, acute, obtuse or rounded apex, wavy, pubescent on the main nerves above, glabrous beneath, 6–17 cm by 2½–6½ cm; petiole ½–1½ cm. *Racemes* spiciform, often nodding at the apex, rather lax, 10–40 cm long. Bracts ovate, acutely acuminate. Pedicels ½–1 mm. *Perianth* during

anthesis 3–4 mm long, afterwards up to 6 mm. *Stamens* 6–8, erect. *Fruit*-spines 4, ± 3 mm long.

Distr. Native of the warmer parts of America, established and reproducing itself by seeds in a few localities near Bogor (W. Java), outside the Botanic Garden from which it is probably an escape, at ± 240 m alt.

Ecol. Under hedges.

Use. When the food of cattle contains *Petiveria* it imparts an unpleasant smell and taste to milk and meat.

Vern. *Guinea-hen weed*, *gully root*, E.

Note. Though the fruits readily adhere to passers-by the plant is still far from common.

3. PHYTOLACCA

LINNÉ, Sp.Pl. (1753) 441; Gen. Pl. ed. 5 (1754) no 521.

Erect (or scandent) herbs (or shrubs), glabrous barring the papillate or shortly hairy main-axis of inflorescence; stem often angular. *Leaves* exstipulate, ovate-oblong-lanceolate, acute at both ends, herbaceous. *Flowers* ♀ [or (♂) (♀)] in terminal

or pseudolateral, often long, sometimes spiciform, erect racemes; pedicels shortish or short, sometimes very short. *Perianth* herbaceous, coloured, 5-partite; segments spreading during anthesis, afterwards often more or less reflexed, equal or slightly unequal, ovate, oval or obovate, afterwards often dark red. *Stamens* (6-)7-22(-33), 1-2-seriate, more or less irregularly arranged; those of the inner or only series inserted on the outer margin of the disk; those of the outer series on the under-surface of the disk; filaments filiform-subulate; anthers dorsifixed, bilobed at both ends. Carpels 5-10(-16), whorled, laterally connate throughout their length into a depressed globose ovary. Styles terminal on the inner angle of the carpels, erect or recurved, subulate, short. *Fruit* baccate, depressed globose, longitudinally 5-10-furrowed. Seeds oval from an inequilateral base, strongly laterally compressed, shining black.

Distr. Species ca 25, tropical and subtropical, mostly in America, a few in Africa and Asia, several species in Europe frequently cultivated as ornamentals. In *Malaysia* only 3 introduced American species.

Ecol. Along road-sides, forest- and field-borders, open jungles, waste places.

Notes. Besides the *spp.* mentioned below, BUYSMAN (Flora 107, 1915, 221) mentions to have cultivated the shrubby *Ph. dioica* L. at Nongkodjadar in E. Java; it did not flower.

Phytolacca acinosa ROXB., a plant with free ripe carpels, is indigenous to Japan, China and the Himalaya. It has sometimes wrongly been credited (e.g. by KOORDERS, Exk. Fl. Java) to Java where it does not occur.

KEY TO THE SPECIES

1. Stamens in all flowers, also in the lowermost ones, 7-9, all of them inserted on the outer margin of the disk 1. *Ph. octandra*
1. Stamens, at least in the middle and lowermost flowers 10-22, partly inserted on the outer margin of the disk, partly on its underside.
 2. Pedicels during anthesis 1/2-2 mm, under the adult fruit 1-2 1/2 mm 2. *Ph. icosandra*
 2. Pedicels during anthesis 2-4 mm, under the adult fruit 4-7 mm 3. *Ph. purpurascens*

1. *Phytolacca octandra* LINNÉ, Sp. Pl. ed. 2 (1763) 631; BURM. f. Fl. Ind. (1768) 107; GRISEB. Fl. Br. W. Ind. Isl. (1864) 58; BTH. Fl. Austr. 5 (1870) 143; TRIMEN, Fl. Ceylon 3 (1895) 410; BAILEY, Queensl. Fl. 4 (1901) 1267; WALTER, Pfl. R. 39 (1909) 58; BACKER, Bekn. Fl. Java. em. ed. 4 (1942) fam. 61, p. 3.

Branched herb, 40-60 cm high; stem angular. *Leaves* oblong-lanceolate or ovate-lanceolate from an acute base, gradually narrowed towards the apex or acuminate, 6-15 by 1 3/4-6 cm; petiole 1-3 cm. Adult raceme 8-25 cm long (3/4-3 cm peduncle included), dense; rachis more or less densely papillate or almost smooth. Pedicels during anthesis 1-2 mm, under adult fruit 2-3 mm. *Tepals* ovate, varying from rather acute to rather obtuse, during anthesis pink, 2 1/2-3 mm long, under the fruit 3-4 mm. Styles 7-9, usually 8. *Fruit* with 8(7-9) longitudinal furrows. Seeds \pm 2 mm long.

Distr. Native of tropical America, extending from Mexico to Columbia, elsewhere locally naturalized, in *Malaysia* in N. Sumatra and W. Java, very local; \pm 1700 m above sea-level.

Ecol. Road- and water-sides, field-borders, waste places.

Uses. Young sprouts and leaves can be used as a vegetable.

2. *Phytolacca icosandra* LINNÉ, Sp. Pl. (1753) 60; PERS. Syn. 1 (1805) 523; WALTER, Pfl. R. 39 (1909) 60; BACKER, Bekn. Fl. Java, em. ed. 4 (1912) fam. 61, p. 3.—*Ph. decandra* (non L.) BACKER, Bull.

J.B.B. II, 12 (1913) 26; BUYSMAN, Flora 107 (1915) 221.

Erect herb, 50-100 cm high; stem angular. *Leaves* ovate-oblong, oblong or lanceolate, 6-20 by 1 1/2-9 cm; petiole 2-6 cm. Racemes erect or sub-erect, 12-35 cm long when adult (including 5-10 cm long peduncle), rather dense, sometimes very dense; rachis of raceme red, rather densely papillate. *Tepals* ovate-oval-obovate, during anthesis pink, 3-4 mm long, under the ripe fruit dark red, 4-5 mm. Stamens, at least in the middle and lower flowers, 10-22, partly on the margin of the disk, partly on the underside of it; in the highest flowers sometimes not more than 7-9, on the margin of the disk. Styles 7-10. *Fruit* 7-8 mm diam., faintly lobed. Seeds \pm 2 1/2 mm.

Distr. Native of tropical America, in *Malaysia*: W. & E. Java, 300-1200 m, locally established.

Ecol. Forest-borders, light forests, road-sides, waste places, locally sometimes very numerous but, on the whole, rare.

Note. The ripe berries are greedily devoured by some species of birds.

3. *Phytolacca purpurascens* A.BR. & BOUCHÉ in Index Sem. Hort. Berol. (1851) App. 13; Linnaea 25 (1852) 297; WALTER, Pfl. R. 39 (1909) 59; BACKER, Bekn. Fl. Java, em. ed. 4 (1942) fam. 61, p. 4.

Erect herb, 3/4-1 1/2 m high; stems angular. Adult racemes not very dense, 20-35 cm long (5-13 cm long peduncle included); rachis sparingly short

papillate. Stamens 12–19. Styles 6–8, rarely 5. For the rest like *Ph. icosandra*.

Distr. Native of Central America, in *Malaysia*: Java. Naturalized here and there, 150–2000 m.

Ecol. Forest-borders, waste places, *Imperata*-fields, abandoned agricultural fields; tea- and *Cinchona*-plantations.

Note. Most reluctantly I have kept up *Ph. purpurascens* as a separate species. In my opinion it is

simply one of the many forms of *Ph. icosandra*, into which it passes by numerous intergrades; it cannot even justly claim varietal rank.

Excluded

Adenogramma oppositifolia HASSK. Flora 34 (1851, 754 = *Alternanthera sessilis* (L.) R.BR.; cf. BACKER) Fl. Mal. I, 4² (1949) 92.