Plant Resources of South-East Asia

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Medicinal and poisonous plants 3

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mixture with 5 other medicinal plants in the form of pills. In China the roots are used to treat dysentery and stomach ache, whereas the leaves are applied externally to treat snakebites and abscesses.

**Observations** A liana up to 8 m long; leaves obovate to broadly elliptical, 7–15 cm × 3–9.5 cm, rounded to cordate at base, acute to rounded and apiculate at apex, densely hairy; inflorescence 4–20 cm long; flowers with corolla yellow-green outside, yellow-brown inside, c. 5 mm in diameter, with ovate lobes; follicle oblong to oblong-lanceolate in outline, 7–13 cm long, *S. juventas* occurs in thickets and forest up to 1000 m altitude.

**Selected sources** 172, 671, 789, 1006, 1013.

Wongsatit Chuakul, Noppanas Soonthornchareonnon & Orawan Ruangsomboon

**Striga asiatica** (L.) O. Kuntze

Revis. gen. pl. 2: 466 (1891).

**Schrophulariaceae**

2n = 24, 40

**Synonyms** *Striga lutea* Lour. (1790).


**Origin and geographic distribution** *S. asiatica* has an extremely large area of distribution: from tropical and southern Africa and Madagascar, through western Asia and India, to Burma (Myanmar), Indo-China, southern China, Thailand and the Malayan region (recorded in Peninsular Malaysia, Java, the Philippines and New Guinea, probably also occurring elsewhere). It has been introduced in North America.

**Uses** In Peninsular Malaysia *S. asiatica* is used externally to treat sores and ulcers. In Papua New Guinea it is eaten fresh with traditional salt as a contraceptive.

In India *S. asiatica* is considered to improve appetite, whereas in China it is used as a stomachic and vermifuge, and to treat intestinal obstructions. In tropical Africa it is also applied in traditional medicine, e.g. to treat headache; an ointment is made from the plant-ash with cow- or sheep-fat, to treat gout. Some other *Striga* species are used as well, e.g. *S. hermonthis* (Delle) Benth., which is applied in African traditional medicine to treat dermatological complaints such as leprosy.

**Properties** The flavonoids acacetin, apigenin and luteolin have been isolated from whole *S. asiatica* plants. They showed dose-dependent anti-implantation activity on rats when administered orally during days 1–4 of pregnancy, at a mean effective dose of 25 mg/kg body weight. In another study, a single oral dose of these compounds (10 mg/kg body weight) on day 1, 2 or 3 of pregnancy resulted in 100% prevention of implantation. Significant antifertility activity of petroleum ether and chloroform extracts of whole plants has also been reported for mice.

The ethanolic extract of whole plants of *S. gesnerioides* (Wild.) Vatke (synonym: *S. orbanchioides* (Endl.) Benth.) from India given for 7 days to immature male rats at a dose of 200 mg/kg body weight caused a significant decrease in the weight of the testes, epididymis, seminal vesicles and the ventral prostate. It also produced a significant decrease in the number of spermatoctyes and spermatids. Ethanolic and aqueous extracts showed antihistaminic and mast cell stabilizing activities in rats. The flavones apigenin and luteolin have been isolated from *S. gesnerioides*.

**Botany** A small, annual, erect herb up to 40 cm tall; stem simple or sparsely branched, quadrangular. Leaves opposite in lower part of the plant, alternate in upper part, simple, linear, 5–15 mm × 1–1.5 mm, entire, hirsute on both surfaces, sessile; stipules absent. Inflorescence an axillary bracteate spike, sparsely flowered. Flowers bisexual, with 2 bracteoles at the base of the calyx; calyx tubular, 5–6 mm long, with 5 stamens, subequally 5-lobed; corolla with 10–13 mm long tube abruptly incurved at apex, shortly glandular-pilose outside, limb spreading, 2-lipped, upper lip obtriangular, emarginate, lower lip 3-lobed, yellow, often scarlet inside; stamens 4, inserted near the top of the corolla tube, didynamous, included, with short filaments; ovary superior, elliptoid, 3-celled, style filiform, stigma capitate. Fruit an ovoid or subglobose capsule, 3–5 mm long, many-seeded. Seeds broadly fusiform, c. 0.3 mm long, striate. Seedling underground for 4–6 weeks and then white, rounded and bearing scale-like leaves, after emergence above the ground green, 4-angularr, densely hairy, with opposite to alternate leaves.

Only 3–4 months are needed to complete the life cycle of the plant. As a hemiparasite, *S. asiatica* attaches itself through haustoria to the roots of a host plant. The seedling grows below the soil surface for 4–6 weeks, during which time it depends upon the host plant for food and water, and is par-
Striga asiatica (L.) O. Kuntze – 1, plant habit; 2, leaf; 3, flower; 4, corolla opened, showing stamens; 5, fruit; 6, seeds.

particularly injurious to the host plant. After this period the plant emerges above the soil and becomes green. About one month after emergence the flowers open, and seeds may be mature again one month later. The minute seeds are dispersed by wind and rain.

Striga comprises about 40 species and occurs in Africa, Madagascar, tropical Asia and Australia. Africa is by far the richest in species (over 30), whereas in tropical Asia about 7 species occur. About half of the species are annuals, the others are perennials with rhizomes or tuberous roots.

Ecology S. asiatica is a hemiparasite on the roots of grasses. It may be a serious pest in crops, e.g. upland rice, maize and sorghum in Africa, and upland rice, maize, millet and sugar cane in India. Under more natural conditions it occurs in deciduous forest, grasslands, along roadsides and in abandoned fields, up to 2000 m altitude. S. asiatica does not succeed well in high rainfall areas. It prefers sandy and welldrained soils, but can also grow on clayey soils.

Management S. asiatica can produce immense quantities of seeds. These may be dormant in the soil for many years, reportedly sometimes over 30 years. The seeds can germinate only when close to a suitable host. S. asiatica is a major pest in field crops. Locally in India, it may reduce yields in rice to such an extent that cultivation has been given up. There is little crop loss in the early stages of an infestation, but the loss increases considerably with the years. The leaves of the attacked crop plants wilt. In South-East Asia S. asiatica is usually not a very serious pest except in a few localities like northern Thailand, where it is noxious in maize, sometimes also in sorghum.

The control of this pest is very difficult, and is often done by spraying hormone weed-killers such as 2,4-D on plants before the flowering stage.

Genetic resources There seems to be much genetic variation in S. asiatica. Its growing habit varies from one crop to another, in different environmental conditions, and between geographical areas. It is obvious that such a widespread species is not under threat of genetic erosion.

Prospects The eradication of S. asiatica as a problematic parasite of crops has received much more attention than research on pharmacological properties. The antifertility activity in particular deserves more attention, and it is striking that one of the recorded uses in South-East Asia is as a contraceptive. Other recorded activities, e.g. anti-inflammatory and antispasmodic, are possibly also attributable to flavonoids such as luteolin and apigenin, but research is needed for confirmation.

 Other selected sources 62, 120, 121, 181, 249, 250, 518, 731.

Noorma Wati Haron

Strobilanthes Blume

Acanthaceae

x = 8; S. custa: n = 8, 2n = 32

Origin and geographic distribution Strobilanthes is one of the largest genera in Acanthaceae, with approximately 200 species, and is distributed in tropical and subtropical Asia. Some species are cultivated within this region or elsewhere.

Uses The leaves and sometimes the roots of S. custa are important in traditional medicine in Indo-China and China. They are used internally to treat irregular menstruation, bleeding after abor-