



Figure 2. A close-up view of the plant.

angular, up to 50 cm long. Inflorescence umbel like, 12–15 flowered. Flowers dull yellow, c. 3 cm across. Petals ovate to orbicular, pale yellow. Stamens numerous, surrounded by whorl of staminodes, yellow. Carpels numerous, laterally flattened and firmly pressed together. Fruit of semi-circular fruitlets. Seeds horseshoe shaped.

Flowering and fruiting: Throughout the year.

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Piper sarmentosum Roxb. – An addition to the flora of Andaman Islands

Piper L. is one of the well-represented genera with about 2000 species¹, distributed along the tropical and subtropical belt of the Old World and the New World. However, the genus is rather poorly represented among the tropical islands of Andaman and Nicobar in the Bay of Bengal. Vasudeva Rao² has reported six species from these islands, viz. *Piper betle* L., *Piper longum* L., *P. miniatum* Bl., *Piper pedicellum* Wall. ex DC., *Piper ribesioides* Wall. and *P. sumatranum* C. DC. However, *P. sumatranum* C. DC. has been merged with *P. ribesioides* Wall. According to current information, there are only six species which include the present addition, occurring in the Andaman and Nicobar Islands.

The insular tropical rainforests occurring on the islands of Andaman and Nicobar have remarkable importance in the study of phytogeography and centre of origin of popular cultivars. The apparent

wild occurrence of certain cultivated species like coconut trees and betel vines in the Andaman and Nicobar Islands, suggests that these islands may perhaps be one of the probable centres of origin of these species. The wild occurrence of betel vines was first reported by Kurz³ from the Great Nicobar Island. Recently, Sreekumar and Ellis⁴ reported three different wild forms of betel vines from these islands.

While exploring the South Andaman Islands under the 'Flora India' project of the Botanical Survey of India, one of the authors had collected some interesting specimens of a *Piper* species from the North Bay region of Mount Harriet hills. The specimens were apparently similar to *P. longum*, one of the well-known wild *Piper* species of the Indian subcontinent, popularly known as the 'long pepper'. Critical studies revealed that the specimens are identical to *P. sarmentosum*

Roxb., a species occurring in Northeast India, South China and Malaysia. The specimens were later sent to Leiden and identified as *P. sarmentosum* Roxb. A perusal of the literature and herbaria studies revealed that *P. sarmentosum* Roxb. has not been recorded earlier from the Andaman and Nicobar Islands until the recent collections from the North Bay.

Morphological features of *P. sarmentosum* Roxb. are similar to those of *P. longum* L. There are some similarities, especially in fruit characters with *P. hapnium* B. Ham., an endemic species occurring in Peninsular India. However, *P. sarmentosum* Roxb. can be easily distinguished from these species by its procumbent fruit-bearing branches with large, stout, sweet fruits on maturity (Figure 1). The sweet taste of the fruit is similar to the mature ripened fruits of *Elaeocarpus serratus* L.



Figure 1. *Piper sarmentosum* Roxb. (procumbent branches with a runner).

The taxonomic description is as follows: *P. sarmentosum* Roxb. ex Hunter, Fl. Indica 1: 162. 1820; *P. longum* (auct. non. L.) Fl. Brit. India l.c. 5: 83.

Glabrous, creeping, terrestrial herbs with procumbent branches. Leaves 6–16 cm × 5–9 cm, thin, lower leaves usually ovate-cordate, upper leaves rather oblong

or ovate-oblong, ovate to obliquely or rounded at base, shortly acuminate at apex, 5–7 radiating nerves from base, dark-green above; petiole 2.5–5 cm long. Spikes short, dense, blunt, cylindric in procumbent branches; male flowers 0.7 cm long, female flowers 0.7 cm long; bracts more or less circular, white, stamens short, stigma 3 to 4; fruit obovoid 1.5 cm × 1 cm, sweet to taste.

P. sarmentosum Roxb. has earlier been reported from the tropical belt of the Indo-Malaysian region, from Northeast India to South China and Malaysia. The recent discovery of this species from the Andaman Islands has much relevance in the study of phyto geography. The species is found along the edges of semi-evergreen type forests at the sea level. Live specimens of this species collected from the North Bay have been introduced into the Field Gene Bank of Tropical Botanic Garden and Research Institute, Thiruvananthapuram, as a part of the conservation programme of Andaman species undertaken by the Institute. The species has good ornamental value and can be grown in pots as bush pepper by pruning the creeping branches. The bushy, procumbent branches are 40–50 cm in height and fruiting season is usually during October–December.

Specimen examined: South Andamans, Mount Harriet, North Bay; 12. 11. 1992, S.P. Mathew 20882 (PBL, TBGT & L).

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Glossiphonia weberi*, an effective predator of the freshwater limpets *Ferrissia baconi

Even after suspecting the involvement of *Ferrissia tenuis* with the spread of schistosomiasis in human beings in Gimvi village, Ratnagiri district, Maharashtra^{1,2}, no attention has been paid so far to study the bioecology of limpets occurring in India. Since limpets are prone to serve as intermediate host of the worm parasite *Schistosoma haematobium*, it is essential to develop strategies to control them. In recent years, we have had the opportunity to observe predation of the freshwater glossiphoniid leeches *Glossiphonia weberi* on the limpet *F. baconi* occurring in Dhakuria lake, Kolkata. As an individual leech was seen to destroy the limpet by way of feeding on the same, we carried out experiments to judge the efficacy of *G. weberi* in monitoring the *F. baconi*

population, with a view to utilize these predators as biological control agents against any of these limpet species, if needed, in future. The results are presented here.

G. weberi and *F. baconi* were collected from Dhakuria lake. They were kept separately in aquaria. After 2 days they were measured and the leeches were grouped into five size-classes, viz. 2–3, 4–5, 6–7, 8–9 and 10–11 mm with respect to their total body length at rest, while the limpets were grouped into three size-classes, viz. ≤ 2, 2.1–3 and 3.1–4 mm on the basis of their shell length. Plastic containers, each measuring 72 mm in diameter and 32 mm in depth, and containing 100 ml pond water were used to carry out the following experiments with a view to

note the rate of predation of *G. weberi* on *F. baconi* during the period of 24 h of a day.

Experiment I: Fifteen limpets belonging to a size-class (either ≤ 2, 2.1–3 or 3.1–4 mm) were exposed to a leech belonging to a particular size-class (either 2–3, 4–5, 6–7, 8–9 or 10–11 mm).

Experiment II: Fifteen limpets belonging to all the three size-classes (≤ 2, 2.1–3, 3.1–4 mm) in different combinations, taking at least two but never more than ten individuals from a size-class together were used.

Control experiments were carried out simultaneously to note the normal mortality in *F. baconi* with a view to determine the actual rate of predation. In all cases equal numbers of *F. baconi* accord-