Adult aerial plants : These are 4–12 cm tall. The average size of the lamina is 429 mm^2.

The upper epidermal cells are isodiametric and possess undulated walls. These are smaller than the cells of the lower epidermis but are larger than those of the upper epidermal cells of adult floating leaves (Table I). Like adult floating leaves, hydropotens are present only on the lower epidermis. The leaves are amphistomatic. Here, the lower epidermis possesses a fairly high number of stomata compared to adult and juvenile floating leaves (Table I). The stomata are paracytic (Figs. 5 and 6).

Juvenile floating leaves : These are 6–15 cm tall. The average size of the lamina is 598 mm^2.

The upper epidermal cells are larger than those of the upper epidermal cells of adult floating and aerial leaves, but are smaller than those of the lower epidermis (Table I). They possess more undulated walls.

Stomata are mostly restricted to the upper epidermis, a few being also present on the lower epidermis (Figs. 7, 8). Like adult floating and aerial leaves, the stomata are paracytic with crescentiform guard cells but a few brachyparacytic ones were also located. Contrary to the adult leaves here the stomata on the upper surface are larger than those on the lower surface. Moreover, they are also larger than those on the upper and lower surfaces of adult leaves (Table I).

In floating leaves the stomatal distribution varies in different species. The most common pattern is their occurrence on the upper epidermis exclusively. Considering that the vascular plants have adopted aquatic habitat secondarily, one may expect the presence of stomata even on the undersurface of floating leaves. That this actually is so has been reported by several workers[2,4,6,7]. The present investigation again shows that well-developed stomata, similar to those found on the upper epidermis, do occur on the lower epidermis of the adult as well as juvenile floating leaves of this taxon, though rarely. Moreover, here the stomatal frequency also varies according to the position of the plant in water. Whereas the deep water forms lack stomata from the lower surface, in shallow water forms they are present on the lower epidermis too, though few in number. A somewhat similar situation has also been encountered by Shinobu[7] in *Potamogeton distinctus*. He observed that in shallow water forms the stomatal frequency on the undersurface of the leaf was 3·6 mm^2 whereas in deep water forms it was 0·75 mm^2. Since the leaves are floating in both the habitats and the stomatal frequency on the upper surface does not differ significantly in the two forms, these data are interesting but difficult to explain.

In view of the above observations, it appears to us that Govindarajalu's report of the absence of stomata on the undersurface of the floating leaves of this taxon is perhaps based on the study of deep water forms only.

Another interesting observation recorded during this study is that when the water recedes from the substratum thereby exposing the plants to a terrestrial habitat, a greater number of stomata developes on the lower surface of the leaves that emerge under such a condition. This may be an adaptive response of the plant to the new environment to which it gets exposed. Evidently this is indicative of the extremely plastic behaviour of the aquatic plants in their somatic organization in response to environment.

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PENICILLIN INDUCED REGULATION OF CHLOROPHYLL FORMATION AND HILL ACTIVITY OF ISOLATED CHLOROPLASTS IN RICE (*ORYZA SATIVA* L.) SEEDLINGS

PENICILLIN action on bacteria is well known, whereas knowledge of its role in plant metabolism is meagre[1]. This note reports the influence of penicillin on the synthesis of chlorophyll and the Hill activity of chloroplasts in rice (*Oryza sativa* L.) seedlings.

Rice seeds were germinated in different concentrations of penicillin in dark, humid atmosphere at 30 C for the first two days and then transferred to continuous light of 4000 lux provided by fluorescent tubes for varying periods. Chlorophyll estimation was done according to Arnon[2] and Hill activity according to Vishniac[3].

TABLE I

Effect of penicillin on chlorophyll content of rice leaves and hill activity of chloroplast

Treatment	Seedling age in days							
	8		10		12		14	
	Chl[a]	Hill[b]	Chl	Hill	Chl	Hill	Chl	Hill
Water control	2·2	0·16	2·8	0·26	3·6	0·10	5·9	0·04
Penicillin:								
250 ppm	2·3	0·19	3·6	0·35	5·2	0·17	7·3	0·13
500 ppm	2·5	0·28	5·0	0·57	6·5	0·35	9·9	0·16
750 ppm	2·5	0·18	5·7	0·41	8·0	0·21	9·6	0·15
1000 ppm	2·2	0·17	5·4	0·32	7·9	0·23	8·5	0·17

[a] Chlorophyll content mg/g fresh weight.

[b] Hill activity measured by DPIP photoreduction (− Δ absorbance at 581 nm).

It is of interest to note that chlorophyll content of rice leaves was greater in penicillin treated plants (Table I). Chlorophyll accumulation was dependent on penicillin concentrations and age of the seedlings. Hill activity was promoted by penicillin treatment showing higher values than control throughout the experimental period. Irrespective of the age of the seedlings, the maximum activity was displayed at 500 ppm penicillin. The data further indicate that the difference from control was the largest in a 10 day old sample which gradually narrowed as the samples grew older. Hill reaction, *i.e.*, oxygen evolution by illuminated chloroplast preparations is generally assumed to represent the photochemical splitting of water. In this context, penicillin may be assumed to have caused improved development and general stimulation of photosystem II reaction and oxygen evolving centres.

In the present experiment, penicillin may be assumed to have undergone transformation to penicillamine, a substituted cysteine which serves as nitrogen source. Apart from supplying nitrogen nutrition, cysteine might donate S–H groups for the synthesis of enzymes liable to enhance the synthetic activity of the tissue. In this context, the results obtained here might be interpreted as due to an indirect effect of penicillin.

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CANTHECONIDEA FURCELLATA (WOLFF.) (PENTATOMIDAE—HEMIPTERA): A PREDATOR OF LEAF-FEEDING CATERPILLARS OF RICE

THE Pentatomid bug, *Cantheconidea furcellata* is known to be predaceous on the larvae of many species of Lepidopterous crop pests. In India, it has been recorded as a predator on the larvae of *Amsacta albistriga* Walk. (David[1]), *Earias* sp., *Semiothisa pervolgata* Walk., *Terias hecabe* L., *Catopsilia pyranthe* L., *Spodoptera litura* Fabr., *Achaea janata* L. (Rao[2]) and on *Thosea cervina* (Rao[3]).

The leaf-feeding caterpillars of rice *Melanitis ledcismene* Cramer (Horned-caterpillar) and *Pelopidos mathias* (F.) (Rice skipper) commonly appear during the pre-flowering stage of rice crop when there is maximum vegetative growth. In Mandya District, Karnataka, September–October is the period when the incidence of these caterpillars is maximum. This period also coincides with the appearance of the Pentatomid bugs on the foliage. Observations made in the field on the feeding habits of these bugs revealed that they are predaceous on these two common leaf-feeding caterpillars of rice,