CONCERNING THE INFLUENCE OF DEEP WATER AND FIELD CONDITIONS ON THE DEVELOPMENTAL PROCESSES OF THE FLOATING RICE (*ORYZA SATIVA* L.)

THE developmental process of floating rice varieties comprises of a number of important growth phases. Two separate experiments were simultaneously conducted one under usual field condition, and the other under deep water condition to study this aspect at the Rice Research Station, Chinsurah, West Bengal. The normal cultivation methods were practised under field condition, *i.e.*, maintaining water level at 6–8 cm under different growth phases. In the second case the plants were grown in suitably constructed tank in a low lying area, and connected with the main drainage channel so that after 2–3 showers of the monsoon, the tank had sufficient water. Data on the variations of water level at various growth phases in the tank and the field are given below:

Deep Water condition		Field condition	
Growth phase	Water level (cm)	Growth phase	Water level (cm)
Germination	Wet	Germination	Wet
Seedling	5–22	Seedling	Wet
Basal tillering	20–50	Basal tillering	6–8
Early culm elongation	42–182	Pre-emerging reproductive	6–8
Nodal tillering	125–190	Flowering	6–8
Late culm elongation	160–210	Ripening	1–8
Pre-emerging reproductive	200–210		
Flowering	132–190		
Ripening	124–142		

'Wet' 37 – 41% soil moisture

The newly developed photosensitive floating variety —'Jaladhi 2'—was grown both under deep water and the field conditions. The seeds were directly sown in wet soil towards the end of April. A diagrammatic representation of the relative lengths of various growth phases throughout the life period (240 days) of the floating rice variety under the field and the deep water conditions is provided in Fig. 1.

After 34 or 35 days from the date of sowing the basal tillers started growing in both treatments (Fig. 1). In general, when the plants attained an age of 45–50 days and were submerged with 40–45 cm, these started forming long internodes. Rapid axial growth of culm is associated with the vegetative phases under deep water condiition. In floating rice plants, the formation of extended internodes is independent of the panicle development and in the later stage only the 3 or 4 uppermost internodes elongated with unusual rapidity. However, under field conditions, the culm elongation and the panicle initiation occurred almost concurrently and the plants behaved similar to normal tall *indica* rice varieties (Fig. 1). It is a matter of common occurrence with many monocotyledonous plants that rapid extension of culm is closely associated with reproductive development[1–3]. The plants under deep water condition entered the nodal tillering phase following the early vegetative culm elongation phase immediately after the aerial (nodal) branching started. Nodal tillering appeared about 3 months after sowing and continued for about 4–6 weeks thereafter. The duration of this period is a varietal character. Under deep water condition all the various growth phases and subphases, *viz.*, basal tillering, vegetative culm elongation, nodal tillering and reproductive ones, are distinct and a knowledge of the various phases would be very useful. With reference to the developmental processes of floating rice plants under deep water condition (Fig. 1), the following phases and subphases could be distinguished: (i) the conpact crown or hard culm

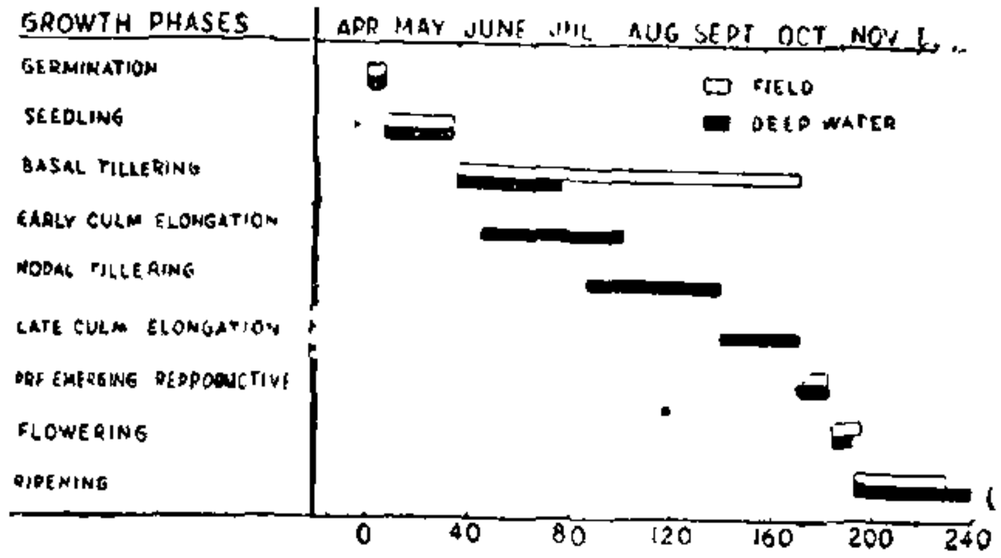

FIG. 1. Relative lengths of various growth phases of floating rice under the field and the deep water conditions.

phase (*i.e.*, covering seedling and basal tillering phases) characterised by having unelongated internodes, a few basal tillers and of relatively long duration; (ii) the early vegetative culm elongation phase associated

with high extension growth of internodes with the axial development, very variable internodal length depending on the depth and duration of submergence and of long duration; (iii) the nodal tillering stage having emergence of aerial branches (nodal tillers) with relatively unaltered culm length and of very variable in number of nodal tillers depending upon the variable depths of submergence and of long duration; (iv) the late culm elongation phase characterised by a gradual increase in length of the internodes situated above the nodal tillers, their numbers dependent on the depth of submergence and duration; (v) the pre-emerging reproductive period associated with the sudden extension of 3–4 elongated uppermost internodes with the aerial development of panicles and (vi) the post emergence prolonged ripening phase. Two important points emerge from the data on growth processes: (i) variability of the different phases and subphases of the floating rice is relatively less marked under field condition and (ii) under deep water condition the vegetative culm elongation periods (early and late) is distinct with larger number of elongated internodes and nodal tillering. The above findings of developmental physiology may offer some scope to the rice workers for the improvement of floating rice varieties. The phasic development of the floating rice under deep water condition is different from ordinary rice culture.

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THREE NEW RECORDS OF FOLIICOLOUS LICHENS FROM INDIA

Recently Awasthi and Singh[1,2] (1972, 1973) and Singh[3] (1973) reported several foliicolous lichen taxa either as new species or new records from South Indian hills and Andaman Islands. However, very little is known about the foliicolous lichens from North-East India. To get more precise information from these parts, the author visited the state of Manipur during the months of October–November 1976, and collected more than 400 packets of different lichens from there. Critical studies on some foliicolous specimens resulted in three new records of lichens for India, which are described below.

Asterothyriaceae

Calenia conspersa (Stirt.) Sant.

Thalli dispersed in small to big patches, 5–30 mm across, smooth, greenish-grey to whitish-grey; sometimes provided with white hairs; apothecia numerous, primarily immersed and closed but at maturity become prominent with a rounded open mouth, 0·1–0·25 mm in diam; disc invisible in young apothecia, but mature apothecia have yellowish-brown, deeply concave epruinose disc; exciple colourless, 5–7 μm thick below and laterally; hymenium colourless, 40–50 μm high; asci 8-spored; spores colourless, transversely 1-septate, ellipsoid, 7–9·3 $\times$ 2·5–3·5 μm; paraphyses branched and anastomosing.

The species known from America and Philippines is characterized by small circular apothecia with disc usually covered by the thalline margin, transversely 1-septate and size of spores. The spore size in our specimen is slightly smaller than the size of spores (8–12 $\times$ 2·5–4 μm) recorded for American and Philippines specimens (Santesson[4] 1952). It is a new generic record for India.

Manipur–Karang: Kabrulakha, *Singh* 54457 (CAL).

Gyalectidium rotuliforme Müll. Arg.

Thalli scattered in small circular to irregular patches, 1–3 mm in diam, usually containing 1–2 apothecia in the centre, smooth, greyish-white, with a single layered plectenchymatous cortex; apothecia immersed in the thallus but prominent, easily shed off from the thalli; yellowish-brown, 0·15–0·25 mm in diam; exciple colourless; hymenium colourless, 85–100 μm high with epithecial algal cells above; asci 1-spored; spores colourless, multicelled, muriform, oblong; 32–60 $\times$ 15–18 μm; paraphyses nonarticulate and branched.

The species distributed in the pantropical regions is characterized by the smooth thallus and presence of epithecial algae. The spore size in our specimen is smaller than the size of spores [50–80 $\times$ 14–25 (30) μm] reported by Santesson[4] (1952).

Manipur-Karang: Kabrulakha area, *Singh* 54458 (CAL).

Tricharia triseptate Sant.

Thallus occurs in small patches, smooth, greenish-grey to whitish-grey, provided with long tapering black hairs; apothecia few, present on the midrib and petiolar region of the leaf, light brown, transpaient, sessile, constricted below, 0·2–0·3 mm