gen uptake and its early translocation to stem.

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October 25, 1949.

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SPAWNING HABITS AND DEVELOPMENT OF THE GANGETIC ANCHOVY, *SETIPINNA PHASA* (HAMILTON)*

LITTLE is known of the life history of the *phasa* fish of Bengal, *Setipinna phasa* (Hamilton) (=*Engraulis telera*), except the descriptions given by Nair[1] of the post-larvæ from 14 mm. to 50 mm., with special reference to the anterior shifting of the anus and the dorsal fin during the larval development. The breeding habits and development of *S. phasa* were worked out in the course of an investigation on the biology of *hilsa, Hilsa ilisha* (Hamilton), and a general study of the fish eggs and larvæ of the Hooghly estuary.

The observations were carried out mainly near Pulta (Barrackpore) from September to December, 1949. The pH of the water ranged from 8 to 8·3 and the salinity 6 to 10 p.p.m. As evinced by the collection of newly laid eggs both during the high tide and the low tide from various points in the river, the fish breeds along a considerable distance above and below Pulta, and spawning takes place in the evening from about 7 p.m. to 10 p.m. The incubation period varies from about 24 to 30 hours at an average water temperature of 28·6° C. The egg is pelagic, transparent and round, with a diameter of 0·95 mm. to 1 mm. and has several oil globules at the time of oviposition, which subsequently coalesce to form a conspicuously large single globule in 2 to 4 hours. The yolk is segmented as in typical clupeid eggs. The hatching takes place on the second day between 6 p.m. and midnight and the larva being practically of the same density as of the river water, either floats or remains in midwater. It is 3 mm. long, transparent and unpigmented. The mouth, anal opening and paired fins are absent. The oil globule in the yolk is close to the head region, as a result of which the larva floats almost vertically with the head-end up. The larva lived under laboratory conditions for six days, and the stages could be checked with yolked larvæ and post-larvæ regularly collected from the river along with the yolked larvæ of *hilsa* (*Hilsa ilisha*). The yolk is completely absorbed when the larva is about 9 mm. in length and the post-larval stage is completed when it reaches about 60 mm. To begin with the post-larva feeds on copepods and other minute crustaceans, but as it grows, it takes to small shrimps.

Delasman[2] has collected and described from the Indonesian waters three kinds of eggs and their larvæ which he concludes as belonging to *Setipinna melanochir, S. breviceps* and *S. taty*. The size of the egg and the nature and disposition of the oil globule in the egg and larva of *S. phasa* are comparatively similar to those of *S. melanochir*, though of the above three species only the last two are recorded from the Indian waters.

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ON TWO NEW RUST FUNGI

IN November 1949, a rust was observed infecting the leaves of *Themeda triandra* Forsk., in and around Burliar (Nilgiris). Uredia and telia were present. They are described below.

Uredia minute, 0·3-0·5 mm. long, hypophyllous, subepidermal, erumpent, bright yellow; urediospores round or oval, orange yellow 21×19μ (16-26×15-24), echinulate, pedicellate, pedicel hyaline, with 6-8 germpores.

Telia rare, mixed with uredia, hypophyllous, black, subepidermal, erumpent; teliospores round, elliptic or polygonal, thick walled, wall up to 6μ thick, smooth, kaiser brown, 28×25μ