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Professor Bayley Balfour F.R.S.

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EMBRYO OF *LAGUNCULARIA RACEMOSA*, GAERTN.

By Professor BAYLEY BALFOUR, F.R.S. (Plate VIb.)

Laguncularia racemosa, Gaertn., is a combretaceous bush of the Western Mangrove spread over the shores of West Tropical Africa and of West and East Tropical America. Its life-history and construction are less known than those of most of the other mangrove plants. I have found no published record of its germination or of the form of the seedling—a feature to which the peculiar environment of mangroves gives particular interest.

I have had occasion to look at the fruit and embryo of the species in an excellent herbarium specimen from Florida, and whilst such material does not give evidence that enables one to depict with accuracy either embryogeny or germination, it has supplied in this case data sufficient to supplement published descriptions of the construction of the embryo.

The sessile fruits of *Laguncularia* are produced in profusion on the long branches of the inflorescence-axis. They are not pendent and are easily detached from the axis—characters all of which do not suggest vivipary.

The dry, one-seeded, one-celled fruit is derived from an inferior ovary and has a spongy, leathery pericarp. Crowning the fruit is a turbinate, leathery calyx, within which lies the hardened flower-disk with the style in the centre, and this intercalycine mass forms a stopper which ultimately separates by a circumscissile slit. The fruit is therefore technically a dehiscent one, but the dehiscence is certainly not active. The club-shaped or elongated pyriform seed has a thin resinous seed-coat and hangs from the roof of the fruit cavity with the micropyle upwards.

The embryo is green within the seed, as frequently happens amongst the Combretaceae. It fills up the whole seed-cavity. There is no food store in the seed outside the embryo. As it lies in the seed the embryo is a somewhat cylindric, fat, and fleshy body about 1.5 cm. long, 2.5 mm. broad, rounded at the basal end, and running out to a narrower apical end. It consists of a central axis which is enwrapped by two cotyledonary folds.

In technical language the embryo has convolute coty-

ledons. Simple convolution of the cotyledons is not the commonest construction of the embryo—it is, in fact, rare. Its form suggests facility of extraction in an exalbuminous seed enclosed in a fruit giving restricted poral exit—but that cannot be the whole adaptation. Most commonly convolution is associated with that tortuous infolding of the parts which is technically described as contortuplicate—a condition which differs from true convolution in this, that the seed-coat follows the infoldings. Almost all genera of Combretaceae are described as having convolute cotyledons, and the true condition is found in *Terminalia* and in *Gyrocarpus*, if that be still admitted to the family. Convolution usually means auriculate cotyledonary extension which more or less covers the radicle. The degree of development depends on the length of embryo axis.

In *Laguncularia* the special feature is that the semi-macropodous axis is more than three-fourths of the length of the seed and the cotyledons appear at the summit of a stipe as short erect lobes, but each of them develops downwards from its margin an auricle on one side, the same side in the two cotyledons, the other side showing no outgrowth. The result is that the convolute part of the embryo is made up of two auricles, one from each cotyledon, enwrapping the hypocotyl.

As an adaptation to specific requirements of germination in correlation with the structure of the fruit the construction seems to suggest: when the fruit falls on the saline swamp water moistens the fruit and enters through the line of circumscission of the stopper which is loosened. As the embryo enlarges, the elongation of the hypocotyl pushes out the stopper—the construction of the fruit-wall precludes all rupture in other directions. Vivipary seems to be excluded.

EXPLANATION OF FIGURES.

- A, embryo entire with enwrapping cotyledonary auricles. R, tip of radicle.
B, embryo from which one cotyledon has been removed and the other unrolled from the hypocotyl H to show its short upward elongation above the hypocotyl and the unilateral auricle extending downwards.
C, embryo from which one cotyledon has been cut off at Cot.¹, and the auricle of the other cut off longitudinally at Cot.²

FIG. 1.

VIA.

FIG. 2.

VIb.