

ADVENTIVE LEAF-BUDS OF *ERANTHEMUM BICOLOR*

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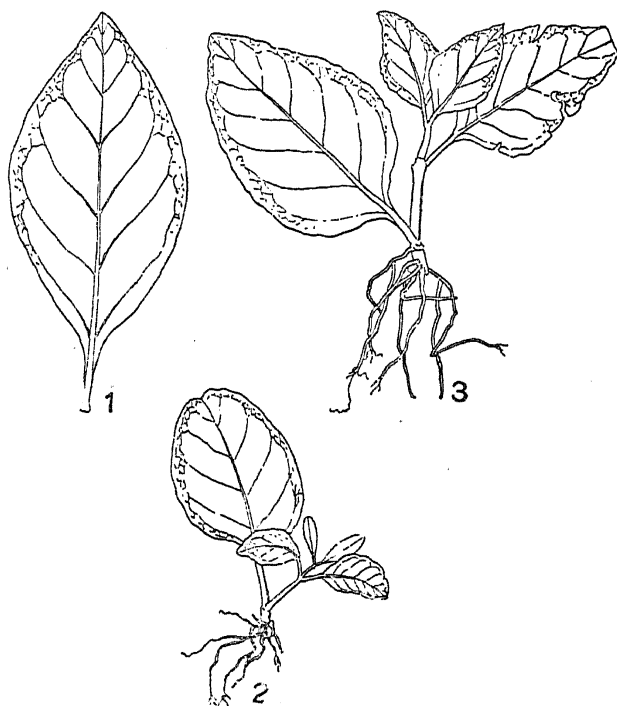
HISTORICALLY leaves of angiosperms are cladophylls. This has been well established by the palæobotanists and plant anatomists (Potonie, Bower, Tansley and others). It is no wonder or anomaly then that we often find isolated (detached) leaves producing vegetative buds, when planted in or falling on moist soils, from the basal ends of the petiole like stem-cuttings.

Recently Arber (1950) has propounded and justified the "partial-shoot" nature of the foliage leaf. According to her the production of buds, vegetative or flower, by the leaves is the "normal urge" on their part, thereby showing a "tendency to assume the status of the parent shoot". Arber, therefore, thinks that the power of bud production remains only latent instead of being altogether absent in this organ.

Buds produced on leaves, internodes and roots are known as *adventive* buds (Lubbock, 1899; Priestley and Swingle, 1929). They are divided into two categories: Natural and accidental. Natural buds on leaves (foliar embryos) have been reported in many plants, e.g., *Bryophyllum*, *Kalanchoë*, *Tolmiea*, etc. (Clamp, 1934; Stoudt, 1938; Yarbrough, 1932, 1936). In *K. daigremontiana* as many as 60 offsprings have been reported on a leaf of large size (Lubbock, Priestley and Swingle, Arber). Deb (1952) reports leaf budding in *Nymphaea stellata* (cf. also Arber). Certain families, e.g., Droseraceæ, Crassulaceæ, Begoniaceæ and Gesneriaceæ most readily produce adventive shoots on their detached leaves (Arber; Stover, 1951). For detailed and more complete information see Priestley and Swingle; Swingle (1940). Natural adventive buds appear in definite parts of the leaf but accidental buds appear when the leaf is wounded or maimed (Lubbock, p. 18). If a leaf of *Begonia* is detached from its mother and placed on damp earth it will produce shoots. Gæbel (1905) reports production of flower buds in *Achemenes* sp. from the petiole end of the detached leaf. Walker (1940) reports formation of leaf buds from the cut ends of the excised leaves of *Lilium candidum* and *L. longifolium*. Excised yellow bordered leaves of *Sansevieria* produce adventive buds at or near the cut ends but the leaves of the new shoot loses the yellow border of the parent leaf and becomes instead "clouded with irregular bars of dark green on both surfaces". Stoudt (1934) reports production of foliar buds from the basal ends of the

excised leaves of *Brynesia*, a dicotyledon. In the detached leaves of *Kalanchoe rotundifolia* he reported production of independent plants on the upper surface of the petiole ends (1938). Yarbrough (1936) made a detailed study of the origin, development and anatomy of the adventive buds in the leaves of *Sedum*; Isbell did the same in *Ipomoea* (1931) and d'Almeida (1928) in *Limnanthemum cristatum* within recent years.

Not all the isolated leaves of a plant show this capacity of producing adventive buds. Neither very young nor very old leaves but the leaves of the mother when she passes through the most vigorous vegetative growth show this feature (Swingle, 1940). Swingle makes a very interesting observation that "the breaking of the communication between the growing point and the leaf supplies the stimulus in bringing about the initiation of new root and stem growing points". This is a very definite statement in support of Arber when she says that the leaf is a partial shoot and the production of a vegetative bud is a normal urge latent in it.



TEXT-FIGS. 1-3. Leaves of *Eranthemum bicolor* showing different stages in the development of adventive buds. Fig. 1, a detached leaf; Fig. 2, shoot and roots developed from the lower end of the petiole; Fig. 3 shows further development of the shoot and roots, the mother leaf is still vigorous and the node-like region is quite evident. All figures drawn from actual specimens, magnified $\times \frac{1}{2}$.

Yet the phenomenon of leaf-bud production from detached leaves is rather rare. Lindemuth (1903-4), Stingl (1908), Janse (1925), Hagemann

(1932)—(all in Swingle, 1940)—made detailed experimental studies of this phenomenon in a large number of species. Their statistical analysis shows that leaves of about 45% of the species studied produced neither roots nor buds, 49% produced only roots and about 10–15% produced buds with roots.

Eranthemum bicolor (Acanthaceæ) is a garden plant. There is a row of these elegant plants along the boundary wall of my garden. They are very healthy plants and with their long petioled broadly lanceolate bicoloured leaves and racemes of flowers with white bilabiate corolla with purple spots on their lower lips make a very beautiful and charming hedge.

Towards the end of the last monsoon months my brother drew my attention to four detached leaves growing on the shady moist earth beneath these plants with new shoots in different stages of growth and development. I collected three and made them museum specimens (Fig. 1, A, B, C). The one left undisturbed has grown into a healthy plant.

The decussate leaves have each a tiny bud in their axils. When the leaves fall on the ground the buds remain on the axis. Therefore they do not develop into leaf shoots. Moreover, the adventive bud is organized a little above the free petiole end on its upper surface, and the region appears like a node (Fig. 1, A, B). A large number of roots also grow from this node-like region. The origin, development and vascularization of these buds are now being studied by one of my students results whereof will be published in due course.

This preliminary report is published as the writer thinks that *Eranthemum bicolor* provides a suitable material for the study of shoot bud initiation by hormone treatment.

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