"SOME MORE PLANTS DEVELOPING ADVENTITIOUS ROOTS FROM LEAVES"

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In the March, 1930, issue of the Journal of the Indian Botanical Society—Vol. IX, No. 1, page 65, Mr. Krishnamurthi has brought to the notice of your readers an example of adventitious roots developing from the cut end of the petiole of *Fittonia verschaffeltii-rubrovenosa* and states that nothing has been mentioned about it regarding the genus *Fittonia* or even the family Acanthaceae. He mentions the common examples of the *Begonia* and *Bryophyllum* plants behaving similarly.

Immediately on reading the above statement, I doubted the correctness of it because I had before my mind as one of the most commonly known and familiar facts, the usual practice of our local gardeners propagating not only *F. verschaffeltii-rubrovenosa* but also some others by leaf cuttings.

These plants are:

1. *Peperomia clusifolia*.
2. *Peperomia magnolifolia*.
3. *Peperomia argyroleuca*.
4. *Saxifraga sarmentosa*.
5. *Fittonia Pearccii*.
6. *Fittonia argyroleuca*.
7. *Fittonia verschaffeltii-rubrovenosa*.
8. *Gloxinias*.
9. *Achemines*.
10. *Gesneras*.
11. *Naegelia Zebrina*.
12. *Saintpaulia ionantha*.
13. *Begonia sp*.
14. *Bryophyllum calycinum*.
15. *Strobilanthes Dyerianus*.
16. *Centrosolania bullata*.
17. *Pellionia Daviana*.
On referring to the following books:—

1. "Gardening in the Tropics" by Woodrow.
2. "Firminger's Gardening in India" by W. Burns.
4. "Encyclopedia of Horticulture" by Bailey,—

I found Mr. Krishnamurthi's statement to be too true. I was specially surprised about the absence of mention of the propagation of these plants by leaf cuttings (i.e., 5, 6, 7, in the above list) in Woodrow's book, since Mr. Woodrow worked in Poona where they are propagated with ease in conservatories.

Mention may, however, be made here that several plants are propagated by leaf cuttings. Woodrow gives Nos. 8, 9, 10, 11, 12, 13 and 14 mentioned in the above list. "Manual of Gardening" by Bailey, second edition, 1910, gives Begonia and Gloxinia, while Fuller in "Propagation of Plants" (1918, Orange Judd & Company, New York) mentions Lilac in addition to Bryophyllum, Begonias and Gesnerias. Rangachariar in his "Manual of Elementary Botany for India", page 312, says that Scilla indica grows by leaf cuttings. Many more plants are said to be propagated by leaf cuttings. Echeveria is propagated by planting a whole leaf. Even roses have been successfully propagated in experimental work by cuttings, vide page 18 of "The Practical Book of Outdoor Rose Growing" by G. C. Thomas, Jr. 1914, Philadelphia & London—J. B. Lippincott Company.

Of course for teaching or illustrative purposes, one uses Begonias and the very easily grown hardy Bryophyllum Calycinum. The latter grows in any place almost without any treatment and is obviously a favourite example to demonstrate adventitious roots from leaf cuttings. But the others mentioned, also multiply themselves very easily under conservatory conditions and may, therefore, be used for the purpose. The last three plants of the list given above produced in my garden adventitious roots from leaves in September, 1930, in 12 days.
Many plants do produce some adventitious or crown roots naturally, and they add valuable lateral support to tall stems in cereals, for example. However, addition of auxin to cut or damaged stems often induces a strong adventitious rooting response. The horticultural industries relying on clonal propagation make good use of this response and annual sales of clonal ornamentals, trees, flowers, and other garden plants continue to rise around the world. Natural roots developing from differentiated cells of any organ (such as the leaf, root, or stem) are termed adventitious roots. These roots are a good source of phytochemicals due to their genetic and biosynthetic stability, their potential for high biomass production, and specific metabolite synthesis (Cui et al., 2011). Adventitious roots are plant roots that form from any nonroot tissue and are produced both during normal development (crown roots on cereals and nodal roots on strawberry [Fragaria spp.]) and in response to stress conditions, such as flooding, nutrient deprivation, and wounding. This general definition distinguishes adventitious roots from primary and lateral roots. Figure 1 illustrates some examples of this diversity of adventitious root types, including but not restricted to junction roots; nodal roots (both crown and brace roots in monocots and nodal roots in eudicots such as strawberry [Fragaria spp.]); nonnodal prop or stem roots used for support (as in ivy and mangroves); stress-induced roots (Arabidopsis [Arabidopsis thaliana]). Definition of Adventitious Root System: Roots that grow from any part of plant other than the radicle or its branches are called adventitious roots (L. adventitious—extraordinary). They branch like the tap root. A mass of adventitious roots along with their branches constitute an adventitious root system. Adventitious root system may be underground or aerial. Horizontal stem of creepers often develop adventitious roots from the nodes (e.g., Grass, Wood Sorrel). Branch cuttings and leaf cuttings (e.g., Rose, Sugarcane, Tapicca, Sansiviena) develop adventitious roots when placed in soil. In Coleus, the cuttings develop adventitious roots on being partially immersed in water. Hormones also induce development of adventitious roots. Typical Adventitious Roots Some plants such as begonia and mint produce buds on the margin of their leaves. When the leaves fall on moist soil, these buds develop into small plantlets. These plantlets get separated and grow into independent plants, thus promoting vegetative propagation. Vegetative propagation by stems. In many perennial plants, the stem develops buds on it. The part of stem that has buds serves as an organ for vegetative propagation. The roots of sweet potato, guava and mint bear adventitious buds. When such roots are planted in the soil, new plants or developed as a result of vegetative propagation. The roots of carrots, turnips and radish bear buds at the base of old stem that serve as an organ of vegetative propagation. Who is vegetative propagation by artificial method used by?