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RESEARCH ARTICLE

Phenome analysis of twelve wild grown seedlings from the forest patches of Dinajpur districts of West Bengal, India with special reference to the family Apocynaceae (*sensu stricto)*

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Abstract Seed and seedling morphology of twelve species of Apocynaceae have been studied. Seeds have been collected, characterized and grown in the seedbed of the garden of Botany Department to raise seedlings for comparison with natural ones for authentication. Seedlings have also been collected from the forest floor in appropriate season. Seedlings are characterized following literatures of previous workers. From distinctive characters, table and key to the taxa have been made. Numerical value has been considered in tabular form for different seedling traits. Numerical data are used for the preparation of the dendrogram by UPGMA method. Dendrogram has been analyzed supporting the placement of species in Apocynaceae (*sensu stricto*). ANOVA and regression of different quantitative traits have also been addressed to strengthen the artificial key for identification and to partially justify Apocynaceae *sensu stricto.*

Key words: *Apocynaceae, ANOVA, phenogram, regression, seedling.*

Introducation

In any plant's life, emergence and establishment of seedlings is the most critical phase of early development (Silvertown *et al.* 1993). Plant species differ greatly in seed and seedling traits; and these traits are often associated with regeneration and / or adaptation in particular habitats (Kitajima & Fenner 2000, Leishman *et al.* 2000). Seedlings raised from larger sized seeds get their resource initially from storage reserves for their growth and development (Hladik and Miquel 1990, Garwood 1996, Kitajima 1996, Green and Juniper 2004). Similarly, seedlings having photosynthetic cotyledons start producing food using sunlight as energy source earlier than those with reserve cotyledons (Kitajima 2002). Therefore, phanerocotylar seedlings rose from seeds of smaller species having paracotyledons demand high light environment for autotrophic growth (Garwood 1996, 2009). Reserve cotyledons, on the other hand, provide resources to support seedling energy demands during times of stress and may be an adaptation to growing in low light (Ibarra-Manríquez *et al.* 2001). However, phanerocotylar seedlings with thick paracotyledons again better adapted to lighter environment and negatively correlated to with seed size (Kitajima 1996).

Of various types of groupings of seedlings, the most comprehensive treatment for Neotropical seedlings, Garwood (2009) used three cotyledon traits abstracting types of seedlings: (a) emergence (cryptocotylar vs. phanerocotylar); (b) position (epigeal or hypogeal) and (c) function (foliaceous or reserve). Based on these parameters, Garwood, 2009 recognized 5 morphological groups: phanerocotylar, epigeal, foliaceous (PEF); phanerocotylar, epigeal, reserve (PER); phanerocotylar, hypogeal, reserve (PHR); cryptocotylar, hypogeal, reserve (CHR) and cryptocotylar, epigeal, reserve (CER).

Robert Brown was one of the most important contributors to recognize asclepiads as more advanced than the members of Apocynaceae *sensu stricto*, because of the presence of pollinia. So, he recognised asclepiads and Apocynaceae of

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