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Research Article

FLORAL BIOLOGY OF MONOCOT FAMILIES FROM A SUBTROPICAL SWAMP FOREST, DEHRADUN, UTTARAKHAND

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ABSTRACT

Subtropical swamp forests provide unique habitats to flourish a wide range of angiospermic plant species in each and every aspect of its landscape. Present work emphasize on enumeration of floral biology of reported eight families of monocotyledons in Karwapani swamp forest. Presented article gives an account of 49 species of 8 different monocot families. Poaceae was the largest family of monocot in the study area with 27 species while Zingiberaceae and Asparagaceae representing with single species.

Key Words:

Monocotyledons, swamp forest, Dehradun.

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INTRODUCTION

In a broad sense dicots and monocots are the two diverse categories in the classification of angiosperms. Monocotyledons are one of the major radiations of angiosperms, and they have been recognized as a separate group from the time of John Ray, 1682 and 1703. One of the main differences between the monocots and other angiosperms is the presence of a single cotyledon. There are about 52000 species of monocots (Mabberley, 1993), representing 22% of all angiosperms. Half of the monocots can be found in the two largest families, Orchidaceae and Poaceae, which comprise 34% and 17%, respectively, of all monocots (Malik, 2015). In monocots flowers show diverse and interesting modifications from much reduced flower structure and wind pollinated grasses and sedges to highly complicated and animal pollinated flowers such as in orchids. The flowers of monocots directly arise laterally from primary axis without any phyllome (Remizowa, *et al.* 2013). Like other various groups of plants flower pattern in monocot influence the taxonomic status which is observed in their structural make up (Cheema. *et al.* 2017). Morphological features such as size, position and number of floral parts are the useful taxonomic characters which helps in taxonomic evaluation of plan (Ornduff, 1969). In general the flowers of grasses lacking exact accessory whorls, sepals and petals, but bear well developed androecium and gynoecium. In

the absence of sepals and petals some other specialized structures known as palea, lemma, lodicules and glumes are present around the necessary whorl (Wolfe *et al.* 1989). Out of these four structures, lemma, palea and glumes are bract like appendages and protective in nature while lodicule is a swollen glandular structure which swells up during anthesis and helps in pollen dispersal.

Through the present study an attempt has been made to evaluate the diversity and characteristic morphological features of monocots of Karwapani fresh water swamp forest.

MATERIAL AND METHODS

Study Area

Karwapani swamp forest is situated near ManakSiddh temple nearby Shimla road and is about 15Km north of Dehradun occupying an area of about 3-4 Sq. Km. The forest forms the border line of Uttarakhand state.

Climate of the area is more or less like that of Dehradun being more temperate and humid than other areas. Summer temperatures can reach up to 44 °C for a few days, whereas winter temperatures are usually between 1 and 20 °C.

Karwapani fresh water swamp is under serious threat due to the encroachment of the urban population and needs to be studied. Construction of water storage tanks for the use of swamp water

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for drinking along with land filling practices. Therefore at many places the swamp has been transformed into an agricultural field, for the cultivation of various food and fodder species.

METHODOLOGY

Swamp forest extensively surveyed in different seasons during the course of study. Plant specimens belonging to monocot group were collected from the all possible locations within study site. The unidentified plant specimens of appropriate size with relevant parts were collected from the field and sealed in polythene bags after taking photographs. In field or laboratory the selected plant specimens pressed with plant press. The dried specimens were mounted on the herbarium sheets following the standard herbarium techniques according to Jain and Rao (1978). These materials were identified with the help of Botanical survey of India (NRC) Dehradun and by using concerned floras to examine the description, distribution and taxonomic position of plants (Kanjilal and Gupta, 1969., Babu, 1977, and R.D. Gaur, 1999). From each family, flower of one species examined for its floral biology as representative member of the family in laboratory.

RESULTS AND DISCUSSION

After frequent field visits it is observed that study area inhabited by a large number of monocot species. A total 49 species of monocots belonging to 40 genera, 8 different families, 13 sub families and 20 tribes were found from study site. Poaceae and Cyperaceae are the dominating monocot families with important species like *Oplismenus compositus*, *Cynodon dactylon*, *Bambusa tulda*, *Cyperus rotundas*, *Cyperus distans* and *Kyllinga nemoralis*. Poaceae observed as dominant family and is represented by 27 species while sedge family is the second dominant monocot family within study area.

Generally monocots comprise very reduced and inconspicuous flowers which are creamish white in colour. Like other angiosperms they have stamens and carpels but obvious sepals and petals are absent. Some specialized structure such as glumes, lemma, palea, and lodicules present around the stamens and carpels.

The present work when compared with Dhyani and Joshi (2007) reveals high diversity of monocotyledons which may be attributed to the fact that their work was on whole floristic diversity and the present work is merely to study the diversity of monocots. Species like *Curculigo orchioides* of the family Hypoxidaceae was not relocated during the present study. Taxonomic position of representative plant species and enumeration of total number of monocot species found is given in Table 1 and 2 respectively.

Table 1 Taxonomic Position of Representative plant species

S.N.	Botanical Name	Order	Family	Sub Family	Tribe
1	<i>Oplismenus compositus</i> L.	Poales	Poaceae	Panicoideae	Paniceae
2	<i>Cyperus rotundus</i> L.	Poales	Cyperaceae	Cyperoideae	Cypereae
3	<i>Commelinia benghalensis</i> L.	Commelinales	Commelinaceae	Commelinoideae	Commelineae
4	<i>Vanda roxburghii</i> R. Brown	Asparagales	Orchidaceae	Epidendroideae	Vandaeae
5	<i>Asparagus adscendens</i> (Roxb.)	Asparagales	Asparagaceae	Asparagoideae	Asparageae
6	<i>Dioscorea belophylla</i> (Prain)	Dioscoreales	Dioscoreaceae	Dioscoreoideae	Dioscoreae
7	<i>Zingiber roseum</i> (Roxb.)	Zingiberales	Zingiberaceae	Zingiberoideae	Zingibereae
8	<i>Calamus tenuis</i> (Roxb.)	Arecales	Areaceae	Calamoideae	Calameae

Table 2 Family wise total number of plant species observed during study period

S.n	Family	Species Names
1	Poaceae	<i>Apluda mutica</i> L., <i>Arundinaria falcata</i> (Nees), <i>Arundo donax</i> L., <i>Bambusa tulda</i> (Roxb.), <i>Capillipedium assimile</i> (Steudel), <i>Chloris barbata</i> (Sw.), <i>Cynodon dactylon</i> (L.) Pers., <i>Cyrtococcum</i> , <i>Accrescens</i> (Trin), <i>Dactyloctenium aegypticum</i> L., <i>Digitaria bififormis</i> (Willd), <i>Echino cloacolona</i> L., <i>Eleusine indica</i> L., <i>Eragrostis atrovirens</i> (Desf.), <i>Eragrostis minor</i> (Host.), <i>Eragrostis gangetica</i> (Roxb.), <i>Heteropogon contortus</i> L., <i>Oplismenus compositus</i> L., <i>Panicum psilopodium</i> (Trinius), <i>Paspalidium flavidum</i> (Retz.), <i>Paspalum paspaloides</i> (Michx.), <i>Pennisetum orientale</i> L., <i>Phalaris minor</i> Retz., <i>Poaannua</i> L., <i>Polypogon viridis</i> (Gouan), <i>Saccharum spontaneum</i> L., <i>Setaria glauca</i> L., <i>Themada caudata</i> (Nees.)
2	Cyperaceae	<i>Carex nubigena</i> (D.Don.), <i>Carex paniculata</i> L., <i>Cyperus distans</i> L.f., <i>Cyperusiria</i> L., <i>Cyperuskyllingia</i> Endl., <i>Cyperusniveus</i> (Retz.), <i>Cyperusnutans</i> Vahl., <i>Cyperusrotundus</i> L., <i>Eriophorum comosum</i> (Wall.), <i>Fimbristylis bisumbellata</i> (Forssk.) Bubani., <i>Kyllinga nemoralis</i> (J.R.Forst), <i>Scirpus atrovirens</i> (Willd.).
3	Commelinaceae	<i>Commelinia benghalensis</i> L., <i>Cyanotis cristata</i> L., <i>Floscopa scandens</i> Lour., <i>Murdannia divergens</i> (Clarke).
4	Orchidaceae	<i>Goodyera procera</i> (Ker Gawl.), <i>Vanda roxburghii</i> R. Brown.
5	Asparagaceae	<i>Asparagus adscendens</i> (Roxb.)
6	Areaceae	<i>Calamus tenuis</i> (Roxb.)
7	Dioscoreaceae	<i>Dioscorea deltoidea</i> (Wall.)
8	Zingiberaceae	<i>Zingiber roseum</i> (Roxb.)

Floral Biology of representative plant species of each monocot family-

Oplismenus compositus

Order: Poales

Family: Poaceae

Inflorescence axis is about 5-15 cm, spikelets hairy arranged in the group of 7-14. Glumes hairy, green or purple. Upper glume absent if present keeled and nerved, lower glume 5-10 mm and sticky. Upper lemma smooth and herbaceous, lower lemma leathery and 7-9-veined. Stamens three with linear purplish anthers. Ovary with two short styles and two stigmas.

Cyperus rotundus

Order: Cyperales

Family: Cyperaceae

Inflorescence having several leafy bracts. Lower bracts longer than the floral head. Spikelets about 1-2 cm in length, spikelets with up to 30 glumes. Pedicels present, glumes are in 2 rows, green, flattened keeled, not pointed. Stamens, polyandrous, with long filaments, anthers linear and basifixed. Ovary tricarpeal syncarpous, and superior with one style and three stigma.

Calamus tenuis

Order: Arecales

Family: Areaceae

Inflorescence very long, flowers minute, male flower about 2.5mm long, with imbricate aestivation. Flowers usually branched into three orders. Stamens 6 arise from the apex of corolla tube, with fleshy filaments. Female flowers grouped

into two orders. Gynoecium tricarpeal, triovulate, stigmas three, apical in position covered with scales.

Commellina benghalensis

Order: Commelinales

Family: Commelinaceae

Flowers funnel shaped arise in clusters on peduncles and produced in spathes. Flowers minute male flowers aerial and open. Androecium consists of two staminodes and three stamens Gynoecium bilocular, tricarpeal, with superior ovary.

Dioscorea bilophylla

Order: Dioscoreales

Family: Dioscoreaceae

Male and female flowers develop on clusters. Cluster produces male flowers in a group of 2-4. Male flowers are about 3mm and consisting 6 greenish white or yellow green tepals and 6 stamens. Female flowers are 8mm long with inferior ovary and 6 stigmas. Each female produce 3 celled seed capsules.

Zingiber roseum

Order: Zingiberales

Family: Zingiberaceae

Flower 3cm in size and pale yellow in color. Flower covered with long, ovate and red bracts, bracteole is shorter than bracts and hairy. Small rounded and yellow staminodes with sessile anthers. Gynoecium made up of long Style and ciliated stigma, ovary with hairy surface.

Goodyeraprocera

Order: Asparagales

Family: Orchidaceae

Many flowers arranged in a panicle or raceme within bracts. Flowers sessile large, zygomorphic. Androecium made up of 2-4 stamens with terminal anthers. Gynoecium bi or tri carpellary containing inferior ovary, locules 1- 3 in axile placentation.

Asparagus adscendens

Order: Asparagales

Family: Asparagaceae

Bracteate and complete flowers develop Solitary or terminaly in racemose pattern. Six perianth leaves arranged in two whorls. Androecium consists of 6 stamens arranged in two whorls, filaments are free or connate, anthers are dithecous and basifixed. Gynoecium is tricarpeal syncarpous, ovary superior with axile placentation, ovules numerous.

DISCUSSION

Monocots are cosmopolitan in distribution which is due to their ability to adapt in extreme environments. They constitute one of the most successful groups of plants, occupying almost all kinds of terrestrial as well as some aquatic habitats.

Like other groups of angiosperms monocots have some peculiar differentiation in their floral appendages i.e. shape, size and numbers of bracts, stamens and ovules. Study reveals that Poaceae is one of the dominant family of monocot, differ from other families due to presence of glumes and lemma and appearance of glumes is significant at both species and generic level. In families such as Poaceae and Cyperaceae the spikelet morphology is of great importance during identification and classification.

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References

- Babu, C.R. (1977). *Herbaceous Flora of Dehradun* (CSIR Publication) New Delhi.
- Cheema, P. et al. 2017. Cytomorphology of Some Medicinal Sedges from North West India. *Ijppr*, Vol. 10 (2): 231-243.
- Dhyani, S. and Joshi, S.P. (2007). Angiospermic Diversity of Karwapani Fresh Water Swamp Forest in Doon Valley, Uttaranchal. *Indian Forester*. 1101-1108.
- Gaur, R.D. (1999). *Flora of District Garhwal North West Himalaya*. Transmedia, Srinagar (Garhwal), U.P. India. P. 811.
- Jain, S.K and Rao, R.R. (1978). *A Handbook of Field and Herbarium Methods*. New Delhi.
- Kanjilal, U.N. and Gupta, B.L. (1969). *Forest Flora of Chakrata*, Dehradun and Saharanpur Forest Divisions, Uttar Pradesh. Manager of Publications Delhi. Printed at FRI press, P.L.O. FRI&C, Dehradun.
- Mabberley, D. J. (1993). *The plant book: a portable dictionary of the vascular plants*. Cambridge University Press, Cambridge, UK.
- Malik, V. (2015). A Checklist of Grasses (Poaceae) of Saharanpur Forest Division. *Indian Journal of Fundamental and Applied Life Sciences*. Vol. 5 (2) pp.74-80.
- Remizowa, Margarita V., Paula J. Rudall, Vladimir V. Choob, Dmitry D. Sokoloff. (2013) Racemose inflorescences of monocots: structural and morphogenetic interaction at the flower/inflorescence level *Ann. Bot.* 112 (8): 1553-1566.
- Ornduff, R. 1969. Reproductive biology in relation to systematics. *Taxon*. vol.18 (2): 121-133.
- Ray, J. (1682). *Methodus plantarum nova*. Faithorne and Kersey, London, UK.
- Ray, J. (1703). *Methodus plantarum emendata et aucta*. Smith and Walford, London, UK.
- Wolfe, K. M. Gouy, Y. Yang, P. Sharp, W.H. Li. (1989), Date of the monocot dicot divergence estimated from chloroplast DNA sequence data *Proc. Natl. Acad. Sci. USA*, 86 pp. 5201-5205.

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