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Studies on Morphological and Quantitative Characters of Different Species of *Oxalis* Growing in Ranchi, Jharkhand

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ABSTRACT

In the present study, morphological and quantitative characters of *Oxalis* species are recorded. It was observed that the flower of *Oxalis corniculata* is the smallest one as compared to other species like *Oxalis latifolia, Oxalis deblish, Oxalis triangularis.* The number of flowers present in *Oxalis corniculata* is similar in *Oxalis deblish*. The leaves are smallest in *oxalis corniculata*. Fruits and seed are recorded only in *Oxalis corniculata* while in all the three species no fruits and seeds are found. Hence *Oxalis corniculata* spreads in the field only by seed dispersal while the three other species reproduce by bulbils.

1. Introduction

Oxalis is considered as the largest genus in the wood-sorrel family Oxalidaceae consisting of approximately 900 known species. The genus occurs throughout most part of the world, except for the polar areas; species diversity is particularly rich in tropical Brazil, Mexico and South Africa [1]. In India, it is represented by 10 species of which 8 species are known to occur in Peninsular India. Among them 4 species were recorded from Kerala [2]. The genus has been monographed by Knuth. Small described a number of new taxa and brought the names into wide usage; it also treated sect. *Corniculatae* as a separate genus, *Xanthoxalis Small* [3]. The genus Oxalis is a small growing weed. It prefers damp condition, and is widespread on heavier soils, and is considered as a troublesome weed that successfully grows in lawns, arable lands, waste places and gardens [4, 5]. It tends to become especially troublesome in pots growing in greenhouses [6]. The family oxalidaceae has been treated as distinct family in doing so on consideration, because the number of oxalidaceae are distinguished from those of related families by these short monodelphous stamens[7].

The vegetative morphology is the first step in plant identification [8]. The external shape, size, colour of the leaves, stems, flower, fruit can be sufficient in some situation to differentiate in genus or species level. The most common aspects used to categorize and identify species concern are the use of external traits of plants, such information stored in the form of ontogeny and number of elements forming reproductive organs (flowers) and dispersion entities (fruits) [9]. Morphological variation leads to different survival strategies has long been recognized because it enables the plants to acclimatize in changing habitats [10].

Phenotypic variability is a reflection of the genetic constitution of the individuals and their interaction with the environment. Thus, morphological expressions are usually pertinent to habitat conditions [11]. Hence, plant populations occupy and are maintained in diverse habitats through the adjustment of morphological expressions [12, 13]. Though it is a matter of considerable interest to view morphological and studies Oxalis growing in Ranchi, Jharkhand.

2. Experimental Methods

The plants were collected from natural growing habitat of different species after survey of localities around Ranchi in during the year of 2015-2016 using standard patterns [14, 15]. The individuals of the species were taken from different places. The photographs were taken by the camera. The plants were kept into paper bags and brought in the laboratory for morphological studies. Morphometracial analysis was measure by using standard protocol with the help of dissecting microscope and scale (Camlin) [16, 17].

3. Results and Discussion

There are 4 species of genus *Oxalis* growing in Ranchi, Jharkhand. They are two categories, those that reproduce mainly by seed and those by bulbils. Only one species *Oxalis corniculata* spread by seed dispersion where as other three species reproduce by bulbils. Morphological variation leads to different survival strategies has long been recognized because it enables the plants to acclimatize in changing habitats. Oxalis corniculata is widely spread from other than three species. *Oxalis latifolia* and *Oxalis deblis* are agricultural weeds in Ranchi, Jharkhand, whereas *Oxalis tringularis* is an ornamental herbs. The external morphology of *Oxalis corniculata* is traliling stem, rooting at the nodes, tap root where the three species are colonial, stoloniferous bulbous herbs lacking upright stems. The petioles arise directly from slender horizontal stems at very near the soil surface.

3.1 Morphological Characters of Species

Habit-Herbaceous, Stem-Traliling diffuse aerial in Oxalis corniculata and stolon like underground bulbe in other three species, Bearing of leaves-Cauline in *Oxalis corniculata* and radical in other three species, Phyllotaxy- Alternate Type of leaves-Compound (Trifoliate), Leaf attachment - Petiolate, Leaf shape- Cuneate, Leaf margins- Entire Leaf apices- Retuse, Leaf Surfaces-Leaf Venation-Reticulate, Taxture of Leaf-Membranous, Inflorenscence- Cymose, Bract- Involucral Bracts, Attachment of Flower-Peduncle(Pedicellate), Presence of floral whorls-Complete. Symmetry of flower- Actinomorphic, Presence of Reproductive Organs-Bisexual, Number of Floral Parts- Pentamerous, Position of floral Organs on thalamous- Hypogamous, Arragement of floral organ-Cyclic, Number of Sepals-five, Cohesion. Gamosepalous, Aestivation-Valvate, Duration of Calyx-Persistent, Number of Petals- Five, Cohesion-Gamopetalous in *Oxalis corniculata* and Persistent in other three species, Aestivation-Twisted, Shape of Corolla-Caryophyllaceous, Appendages of Corolla-Nectary, Number of stamens-Ten, Cohesion of Stamens-Monodelphous, Adesion of stamens-Epipetalous, Lenth of filament-Didynamous, Position of Stamens-Inserted, Number of locules-Monothecous, Attachment of Fillament- To Anther-Dorsifixed, Type of Connectives-Discrete, Number of Carpels-Pentacarpellary, Cohesion of

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Carpels-Syncarpous Position of Ovary on thalamus-Superior, Number of Locules-Pentalocular, Number of Ovules in each Loucle-one, Placentation-Marginal (only in Oxalis corniculata whereas absent in other three species), Style-Terminal and Stigma-Capitate, (only in *Oxalis corniculata* whereas absent in other three species). The morphometric characters of *Oxalis* species was observed that the flower of *Oxalis corniculata* is the smallest one as compared to other three species shown in Table 1. The internode length (0.4-4 cm) Capsule length (8-28 mm) Capsule breadth (2-4 mm) Seed size (8-10 mm) only measured in the *Oxalis corniculata*. The striking variation between the stamens and carpels can be seen in Fig. 1.

Table 1 Comparison of the quantitative characters of the four species of genus oxalis found in Ranchi, Jharkhand

S. No.	Quantitative Character	*Oxalis Corniculata*	*Oxalis latifolia*	*Oxalis deblis*	*Oxalis triangularis*
2.	Petiol length (cm)	0.9-7 ±0.18	5-18 ±0.24	2-25±0.22	4-28 ±0.37
3.	Leaf Diameter (cm)	0.6-3 ±0.32	3-9 ±0.19	3-9 ±0.24	4.5-9 ±0.63
4.	Leaf length (cm)	0.4-2.7 ±0.29	2-5 ±0.37	1.5-4.±0.25	2-3.5 ± 0.45
5.	Leaf breath (cm)	0.5-2.6 ±0.27	2.5-6 ±0.38	1-6 ±0.43	4-6 ±0.73
6.	Pedice length (cm)	0.5-7 ±0.23	10-21 ±0.31	4-26 ±0.41	12-25 ± 0.37
7.	No of flower	3-8 ± 0.83	6-12 ±0.32	3-9 ±0.31	6-9 ±0.43
8.	Flower diameter (mm)	9-13 ±0.34	1-1.5 ±0.41	1-2c ±0.21	1.5-2.3 ±0.62
9.	Sepal length (mm)	3-5 ±0.34	0.5-6 ±0.34	6-8 ±0.32	5-6 ±0.42
10.	Sepal breath (mm)	1-2 ±0.32	15-20 ±0.26	1-2 ±0.31	15-20 ±0.34
11.	Petal length (mm)	4-8 ±0.34	10-13 ±0.23	9-15 ±0.39	20-23 ±0.31
12.	Petal breath (mm)	2-3 ±0.21	5-8 ±0.21	5-6 ±0.28	4-5 ±0.42
13.	Stamen length (mm)	4-5 ±0.28	7-8 ±0.25	5-7 ±0.72	5-6 ±0.42
14.	Style length (mm)	4-5±0.43	2.5-3 ±0.28	3-4 ±0.62	7-8 ±0.51

Fig. 1 Different species of *Oxalis* flowers, with removed petals and sepals

4. Conclusion

The genus oxalis having enormous range of morphological characters, but there are less studies in this field. The morphological and morphometracal characters of different species were carried out with the focus of diagnostic characters and attempt to document information. It will be helpful in proper identification and equitable biological resources.

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