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Research Article

A STUDY ON FIELD LEVEL VARIABILITY AND DIVERSITY IN *BIOPHYTUM REINWARDTII* (ZUCC.) KLOTZSCH. VAR. REINWARDTII

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Abstract: Variability and diversity of *B. reinwardtii* var. reinwardtii, an important plant species, in its natural habitats in Kerala has been analysed based on the observations on seven growth characters recorded from seven accessions of the species distributed across Kasaragod, Kannur, Kozhikode, Wayanad, Malappuram, Palakkad and Thrissur Districts of Kerala State, India. Among the seven characters studied all the characters showed statistically significant variations between populations. Highly significant variability in the case of morphological characters indicates the strong genetic base of the plant species in the field providing it the genetic potential to overcome the threats of fragmentation and extinction in the study area. However, *B. reinwardtii* var. reinwardtii being a fragile and herbaceous annual, drastic alteration in their habitats and climate change can pose serious threat thus making it rare and vulnerable in future.

Keywords: *Biophytum reinwardtii*, accessions, field variability, genetic variability

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Introduction

Biophytum reinwardtii (zucc.) Klotzsch. var. reinwardtii of the family Oxalidaceae is a medicinal plant seen during the rainy season throughout the warm parts of Southern India. The plant is reported to possess tonic and stimulant properties, used for chest complaints, convulsions, cramps and tumours. Even though the plant possesses high value, it is not propagated and cultivated elsewhere. Since the natural habitats of *B. reinwardtii* var. reinwardtii is changing due to climate change and human interventions may cause serious threat to the diversity and frequency of the species. In this context this study approach to asses extend of field level variability shown by the plant in Kerala based on morphological characters studied from seven accessions. Twelve plants were selected from each population at random, so as to represent the intra populational variability appropriately and observed for seven morphological characters. Study of field level variability of any species is a very important step in the assessment of the genetic variability and diversity of the species in its natural habitats. Understanding genetic variability and population structure of rare and isolated plant species is of great importance for assessing extinction risk and setting up conservation plans [1]. Similar studies have been carried out by other workers like Umamahesheswari and Mohanan, (2004) [2]; Chandramohanan and Mohanan, (2005) [3]; Nair, (2008) [4] and Raihanath, *et al*. (2012) [5] in other plant species.

Materials and Methods

The study includes observations on morphological differences between the different accessions located at Padannakkad, Kasaragod (Dt), Iritty, Kannur (Dt.), Maniyur, Kozhikode (Dt.), Edakal caves, Wayanad (Dt.), Kottakkal, Malappuram (Dt.), Pattambi, Palakkad (Dt.), Peechi, Thrissur (Dt.) of Kerala, so as to assess the variation between them. Morphological variability among the accessions of the different genotypes was analyzed by different morphological characters like Plant Height, No. of Leaves, Leaf Length, No. of Leaf lets, Peduncle Length, No. of Inflorescence, No. of flower/Inflorescence with the help of mean, range, standard deviation, coefficient of variation and Critical Difference.

Twelve plants were selected from each population at random, so as to represent the intrapopulational variability appropriately.

Results and Discussion

The data on growth characters of plants were recorded and analyzed statistically for the study of variability. range, mean, standard deviation and coefficient of variation were calculated [Table-1]. Statistical significance of the variability was analysed using ANOVA. All the seven characters studied showed statistically significant variation between the populations. Among the characters studied the highest coefficient of variation was shown by Peduncle Length (50.67) followed by Number of Inflorescence (43.39). The study reveals that the species *B.reinwardtii* var. reinwardtii possesses statistically significant variability in its natural habitats of Kerala. Such significant variability in the case of morphological characters indicates the strong genetic base of the plant in the field thereby making it capable of overcoming the threats of fragmentation and extinction. However, ecological changes in the habitats, changes in the agricultural practices of the society and land conversion for other purposes may cause serious threat to the species in future.

Table-1 Growth characters of *B. reinwardtii* var. reinwardtii

Characters	Range	Mean	SD	CV	CD
Plant Height	12.12-22.7	16.27	4.66	28.64	2.56
No. of Leaves	11.75-17.75	13.72	2.34	17.05	2.67
Leaf Length	3.05-5.28	4.17	0.91	21.82	0.392
No. of Leaf lets	13.27-19.13	16.74	2.19	13.08	1.764
Peduncle Length	3.12-11.11	5.97	3.02	50.67	0.68
No. of Inflorescence	3.76-10.16	6.13	2.66	43.39	1.48
No. of flower /Inflorescence	5.97-11.89	8.04	2.09	25.99	1.22

Conclusion

This study shows significant variability among *B. reinwardtii* var. reinwardtii in natural habitats. This study demonstrated the characters involved in the genetics and variability of this herbaceous plant.

Application of research: Finding reveals the species *B.reinwardtii* var. reinwardtii possesses statistically significant variability in its natural habitats of Kerala.

Research Category: Botany

Abbreviations:
SD: Standard Deviation
CV: Coefficient of Variation
CD: Critical Difference
Dt: District
ANOVA: Analysis of Variance

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Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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