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RECENT TRENDS IN LIFE SCIENCE ENERGY AND ENVIRONMENT

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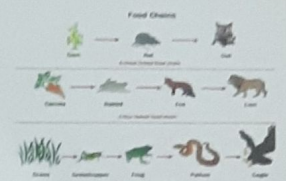
Dapoli Urban Bank Senior Science College, Dapoli

Dr. Bapu Arjun Yamgar

Assistant Professor

Dept. of Chemistry

Dapoli Urban Bank Senior Science College, Dapoli



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Dr Sandesh Pandurang Jagdale
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Seminar, conferences, workshops attended/presented paper: 17
Undergraduate 29 years and postgraduate: 24 years
Ph.D. guide subject Zoology and Botany
Vice Chancellor's nominee for different committees
Worked as field expert in subject Zoology in different project



Dr. Babu Arjun Yamgar
Dept. of Chemistry
Assistant Professor
Dapoli Urban Bank Senior Science
College, Dapoli

National, International Publication: 11
Seminar, conferences, workshops attended/presented paper: 30
Research project -minor, major : 3
Teaching experience:
Undergraduate and postgraduate: 10 years
U.G.C. Research fellowship in sciences for meritorious student: 2009



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CHIEF EDITOR

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Dapoli Urban Bank Senior Science College, Dapoli

Dr. Babu Arjun Yamgar

Assistant Professor

Dept. of Chemistry

Dapoli Urban Bank Senior Science College, Dapoli

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Improvement of seed germination of rare and threaten species of *Ceropegia* and its restoration through developed tubers

¹Ramesh Kashetti¹ Deepak Bhaskar Shelke² Ghalme R. L³

¹Dept of Botany, Anandibai Raorane Art's, commerce and science college, Vaibhavwadi, Sindhudurg.

²Dept of Botany, Amruteshwar Art's, commerce and science college Vinzar, Velha, Pune.

³PG & Research laboratory, Botany dept., Dapoli Urban Bank Senior Science College Dapoli, Dist., Ratnagiri, MS, India.

Corresponding author: rlghalme@gmail.com

Abstract:

The pharmaceutically important *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata* species are under threaten category due to several factors. Therefore, it is necessary to optimized efficient protocol for its multiplication and conservation. In present study attempt were made to optimized protocol for tuberization of the herbaceous, endanger, rare and endemic *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata* through in vivo culture by improved seed germination and seedling growth. The seed treated with germinator showed significant improvement in seed germination percentage of *Ceropegia lawii* Hook 94.7 ± 0.35 and *Ceropegia oculata* Hook var. *oculata* 75.7 ± 0.52 compared with seeds without germinator treatments (86.3 ± 0.48 and 66 ± 0.47 respectively). The germinated seedlings of *Ceropegia* species was successfully transferred in soil where it grows luxuriantly and showed well tuberization. After five months of plant growth the harvested tubers were successfully transferred in their natural habitat for its restoration. This developed protocol can be employed for productive conservation of *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata* on large-scale.

Key Words: *Ceropegia*, Seed germination, Improvement, Tuber, Restoration

Introduction

The genus *Ceropegia* (Asclepiadaceae) distributed in tropical and subtropical Asia, Africa, Australia, Canary and Pacific islands (Anonymous 1992; Bruyns 2003). It comprising 200 species among which 55 species are in India (Malpure et. al. 2006), from which 28 endemic (Jagtap and Singh 1999). The hot spot western ghat having 38 species reported among them 22 are endemic and most are endangered (Yadav and Mayur 2008; Surveswaran et. al. 2009; BSI 2002). The habit *Ceropegia* generally tuberiferous erect herb and climber some species having beautiful flower it use as ornamental and cultivated in Europe and United states (Hodgkiss 2004; Reynolds 2006). *Ceropegia* species are store house of starch, sugars, gum, albuminoid, fats, crude fiber and other valuable phytoconstituents which are routinely used in traditional Indian ayurvedic drugs for the treatment of gastric disorders, diarrhea, dysentery, urinary tract disorders etc. (Kirtikar and Basu 1935). Due to the presence of pyridine alkaloid 'cerpegin' *Ceropegia* having pharmaceutical importance (Sukumar et al. 1995). The CITES of India, states: Analysis of field records reveals that they (*Ceropegia*) prefer undisturbed habitat and climate and any sort of disturbance affect the population resulting into quick decline of wild status (CITES 1998). There is a big threat to plant because of anthropogenic such as habit destruction, exploitation and natural factors such as climate change, availability of pollinators, problem in seed settings, and mode of propagation. The endemism and number of threats to plant it push to plant in endanger and critically endanger category.

The *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata* are herbaceous tuberous plant. They fall under endanger, rare and endemic category. The plants consist of pharmaceutically important constituents. The *Ceropegia oculata* Hook var. *oculata* leaves has long petioled, orbicular or broadly ovate, cordate at base, acute to acuminate at apex, acumen straight, coriaceous and pedicels glabrous. The flowers are pinkish outside with distinct white spots at apical portion of corolla tube, corolla tube distinctly dilated at base (globose). The corona c. 6.5 mm high; outer corona consists of five distinctly bifid subsubulate lobes and corpuscle are longer than broad and obtuse at apex (Punekar et al. 2006). The *Ceropegia lawii* Hook is a woody herb, 30-60 cm tall, with very large, fresh green leaves, 5-10 cm. The white flowers have the typical lantern-shape, associated with *Ceropegias*. The flower tube has 5 lobes, curved into a closed bowl shape. The lantern shaped flowers are purple inside. It is now in endangered category because of natives utilized its tubers for consumption (Sri Rama Murthy et al. 2012). The *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata* population is coming under endanger, rare

and endemic category because of habitat destruction, tuber survival rate, poor seed setting and its germination percentage. However, it is an immediate need to develop an efficient protocol for its reestablishment or conservation through restoration. Therefore, present investigation attempt was made for improve seed germination of these two species seeds and in vivo development of tubers for its restoration.

Material and Methods:

Seed collection:

The dry and mature pods of *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata* were collected in month of January from the Western ghat region of Vaibhavwadi. The pods were subjected to oven drying up to 24 hrs at 40 °C for uniform drying. After uniformed drying, the seeds from the pods were separated and preserved in paper bag for future use.

Seed germination and germinator treatment:

The preserved seeds were allowed to germinate in Petri plate in the month of June. The seeds of this two species were surface sterilized with 0.1% mercuric chloride for 3 min and subsequently washed five times with sterile distilled water. The seeds were further allowed to germinate in separate petri plates (180 mm), containing germination paper supplemented with 10 ml of water for control petri plates and 10 ml of water including 1 ml of Gibberellic acid (1 mg/lit) solution. Each petri plate contains 100 seeds. The seed were incubated in incubator at 28±2 °C for seven days. After seven days, the percent germination rate of control and treated seeds was evaluated.

Seedling growth and tuberization:

The seven days germinated seedlings were transfer in to the plastic trays containing the mixture of soil, coco pit and sand (2:2:1). The each treatment and species germinated seedlings were transfer in separate plastic trays. The trays containing seedlings were kept in shade net house for further growth and development. After five months of growth tubers were harvested and preserved in the dry place in paper bag.

Restoration through tubers:

In the beginning of monsoon season in month of June, the preserved tubers of *Ceropegia* species were transfer in to their natural habitat on the hills of Vaibhavwadi.

Statistical analysis:

The germination experiment was performed in triplicate. Student t test were performed to find significant difference between germination of treated and non treated seeds of *Ceropegia* species at $p < 0.05$ significance level.

Result and Discussion:

The *Ceropegia* is one of the important genus comprising 200 species among which 55 species present in India (Malpure et al. 2006). The hot spot western ghat having 38 species reported among them 22 are endemic and most are endangered (Yadav and Mayur 2008; Surveswaran et. al. 2009; BSI 2002). The tubers of *Ceropegia* species eat by animals and local people as a food and most of species has problem of seed germination. The lack of regeneration source *Ceropegia* species population decline rapidly. Therefore, it is necessary to makes efforts for its conservation. The germinator treatment increased seed germination in *Ceropegia lawii* Hook 94.7±0.35 percent and *Ceropegia oculata* Hook var. *oculata* 75.7±0.52 percent compared with seeds without germinator treatments 86.3±0.48 and 66±0.47 percent respectively (Fig. B). The germinator treatment increased seed germination in *Ceropegia lawii* Hook by 8.4% and *Ceropegia oculata* Hook var. *oculata* by 9.7%.

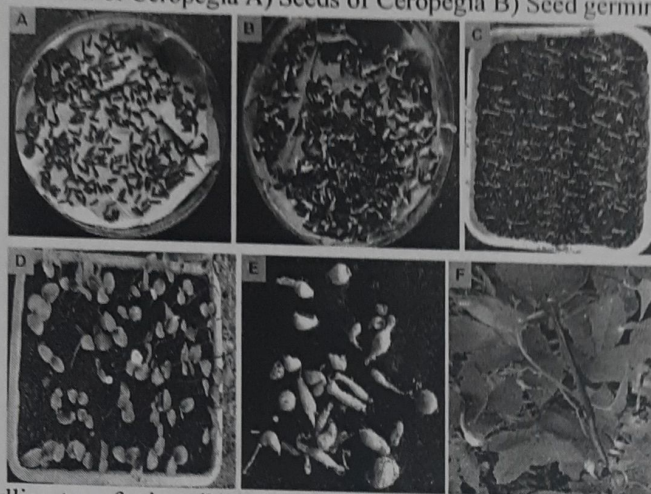
Table 1: Germination of *Ceropegia* seeds. The significant difference between treated and non treated seeds of *Ceropegia* species at $p < 0.05$ denoted by *.

Species	No. of seed used for germination per replicate	Seed without treatment (%)	Seed with germinator treatment (%)
<i>Ceropegia lawii</i>	100	86.3±0.48	94.7±0.35*
<i>Ceropegia oculata</i>	100	66±0.47	75.7±0.52*

The geminated seedlings were successfully established in the used soil mixture and formed the mature plants. All the transfer plants were grown successfully and showed 70% survival rate of the seedlings in shade net house (Fig. D). After five month of plant growth tubers of these plants were harvested (Fig. E). The harvested tubers were preserved in paper bag for cultivation. In the beginning of monsoon season in

month of June the preserved tubers were restore in the natural habitat of Vaibhavwadi hills. From these tubers plant were well developed in the natural habitat, which form a flowers and pods (Fig. F).

Figure 1: In vivo cultivation of *Ceropegia* A) Seeds of *Ceropegia* B) Seed germination of *Ceropegia* C)



Germinated seedling transfer in soil D) Growth of seedlings E) Tubers harvested from plants F) Restoration of *Ceropegia* in natural habitat.

Conclusions: The germinator treatment successfully improved the seed germination in *Ceropegia lawii* Hook and *Ceropegia oculata* Hook var. *oculata*. The transferred seedlings in soil successfully developed tubers. These harvested tubers form from in vivo grown plants successfully developed a plants in their natural habitat. Therefore, this in vivo study gives the protocol for efficient plant regeneration, which ensures the sustainability of conservation programs. However, there is a more need of research to increase the survival rate of seedlings in soil.

References:

1. Anonymous (1992) *Ceropegia* Linn. (Asclepiadaceae), The wealth of India. Vol. 3. New Delhi, (CSIR), 448.
2. Bruyns PV (2003). Three new succulent species of Apocynaceae (Asclepiadoideae) from Southern Africa. *Kew Bull* 58:427-435.
3. BSI, Studies on Rare and Endangered Species. <http://www.envfor.nic.in/bsi/research.html>; 2002.
4. CITES (1998) Checklist of CITES Species, A reference to the appendices to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES Secretariat/World Conservation Monitoring Centre, Genève, Switzerland.
5. Hodgkiss RJ (2004) <http://www.succulent-plant.com/cerogp.html>.
6. Jagtap A, Singh NP, Fascicles of Flora of India, BSI, Calcutta, India, 1999, 211-241.
7. Kirtikar KR, Basu BD (1935) Indian medicinal plants 3, (M/ s Bishen Singh Mahendrapal Singh, New Delhi), India, 1638.
8. Malpure NV, Kamble MY, Yadav SR (2006) A new species of *Ceropegia* L. (Asclepiadaceae) from the Western Ghats of India with a note on series *Attenuatae* Huber, *CurrSci*, 91, 1140-1142.
9. Puneekar SA, Jagtap SD, Deokule SS (2006) A new variety of *Ceropegia oculata* Hook. (Apocynaceae: Asclepiadoideae) from Satpuda hill ranges of Maharashtra, India. *Current Science*, Vol. 91, No. 9.
10. Reynolds S (2006) <http://www.sagereynolds.com/cero/clist.com>.
11. Sri Rama Murthy K, Kondamudi R, Chandrasekhara Reddy M., Karuppusamy S. and Pullaiah T (2012) Check-list and conservation strategies of the genus *Ceropegia* in India. *International Journal of Biodiversity and Conservation* Vol. 4(8), pp. 304-315.
12. Sukumar E, Gopal RH, Rao RB, Viswanathan S, Thirugnanasambantham P, Vijayasekaran V (1995) Pharmacological actions of cerpegin, a novel pyridine alkaloid from *Ceropegia juncea*. *Fitoterapia* 66 (5):403-406.
13. Surveswaran S, Kamble MY, Yadav SR, Sun M, Molecular phylogeny of *Ceropegia* (Asclepiadoideae, Apocynaceae) from Indian Western Ghats, *Plant Syst Evol*, 281, 2009, 51-63.
14. Yadav SR, Mayur YK (2008) Threatened *Ceropegias* of the Western Ghats and Strategies for Their Conservation, pp. 123-134. In: Rawat G.S. (Ed). *Special Habitats and Threatened plants of India*. ENVIS Bulletin: Wildlife and protected Areas Vol. 11. Wildlife Institute of India, Deharadun, India