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Conservation and management of rare fern allies of *Huperzia phyllantha* (Hook. & Arn.) Holub

M. Maridass and G. Raju
Department of Zoology, Pioneer Kumaraswamy College, Nagercoil- 629003,Tamilnadu
Corresponding Author Email: maridassugcpdf@yahoo.co.in

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Short Notes

Approximately, 3.4% of the total number of plant species were found on Earth. Now, estimated 47% of the world's flora is declining in the world. Over 8,000 plant species worldwide are threatened with extinction, according to the World Conservation Union, and that number grows daily. Plants and their communities are an indispensable part of the Earth's biosphere as plants not only affect ecosystem functioning, but also provide essential ecosystem services for the benefit of human. Many factors are contributing to the loss of plant species, and these threats act synergistically. Foremost among the causes of extinction is conversion or destruction of habitats by humans. Over harvesting of wild plants species are used for food and medicine. These plant species were going to endangered categories.

The genus of *Huperzia* has a cosmopolitan distribution, about 415 species found in throughout the world. Species of Huperzia moss tea has been used for centuries in traditional Chinese medicine to treat fever, blood loss and irregular menstruation. Traditionally, the whole moss was used in herbal formulas, but modern preparations use only Huperzine-A, an alkaloid found in hoppers that prevents the breakdown of acetylcholine. Since the loss of acetylcholine function is a characteristic of several disorders of brain function, Huperzine-A is believed to be effective in stopping the spread of Alzheimer's disease. Huperzine-A may also protect brain tissue, further increasing its potential for helping reduce symptoms of some brain disorders. There is also evidence that suggests Huperzine is effective in increasing memory (Cheng and Tang, 1998; Wang *et al*.,1999; Veda *et al*.,1997; Skolnick, 1997).

The present study was conducted in the field trips during the month of January 2014 - February 2015 from Western Ghats regions, Theni, Tamil Nadu. The collected species of *Huperzia phyllantha* (Hook. & Arn.) Holub was collected and identified. Macroscopic and microscopic characters of *H. phyllantha* were studied in live specimens collected from Western Ghats, Theni, Tamil Nadu.

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Fig.1: Pot culture of *Huperzia phyllantha* (Hook. & Arn.) Holub

The field study was observed in *H. phyllantha* species reproduction by asexual method. Earlier studies, Huperzia species are sexual propagules of spores, but they are usually inactive, complicated and germination takes several years (Benzing, 2012). The similar species of *Huperzia* Helena were multiplication of vegetative propagation methods by using stem, leaf, root, rhizomes or other cuttings are a better option (Maridass *et al*.,2011).

Earlier studies, Hartmann *et al*., (1990) reported that many commercial horticultural plants were successfully developed in vegetative methods. *Huperzia phyllantha* is spore-bearing microphylls in differentiated strobili but no peduncles are produced. Immature, green eusporangia are near the top of the photo in the close-up of the strobilis. A few yellow to white, ripe sporangia are found below the green ones. Toward the bottom of the strobilus the sporangia have shed their spores and are collapsed.

The Microscopic observation of spores of *H. phyllantha* (Hook. & Arn.) Holub is triangular to sub-triangular in outline, trilete in nature with the sides straight to somewhat concave margins (Fig.4). Distal spore surface shows foveolate ornamentation while proximal surfaces are ornamented.

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Fig.2: Spore bank of *Huperzia phyllantha* (Hook. & Arn.) Holub

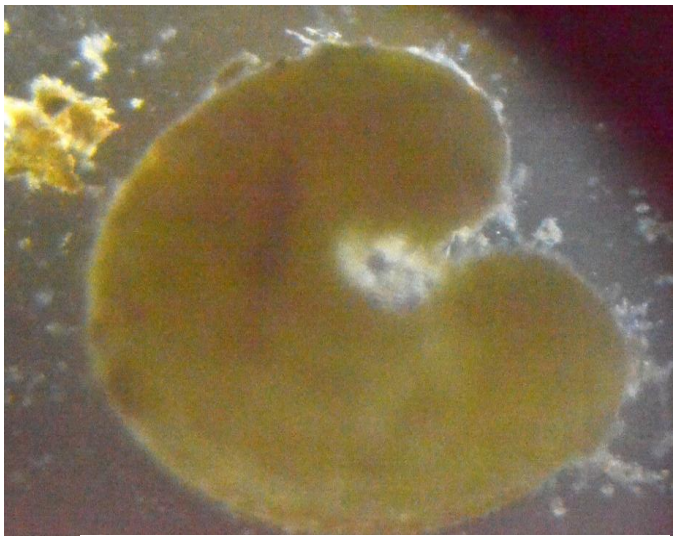

Fig.3: Microscopic observation of sporangium of *Huperzia phlegmaria* (L.) Rothm

Fig.4: Microscopic observation of spores of *Huperzia phyllantha* (Hook. & Arn.)

Fig. 5: Regeneration of *Huperzia phyllantha* (Hook. & Arn.) Holub through micophylls

The present study observed fern allies of *Huperzia phyllantha* (Hook. & Arn.) Roth was collected from then is forest region of Western Ghats, Tamil Nadu. The habit of *Huperzia phyllantha* (Hook. & Arn.) is the unique structure of the body, and overlapping sporangia to form in cones at the end of branches and simplicity in foliage morphology (Fig.3), but with equal ancient novelties. Huperzia species are very slow growing plants, and germination of a spore could take 15 years to develop into a gametophyte (Benzing, 2012; Cobb, 1963). Life cycle of *Huperzia* species is a very long duration. This factor is one of the reasons for the decline of their population and another reason of *Huperzia* species are harvested for decorative purposes and medicinal uses. Harvesting for greens is different from this plant in that the entire aboveground runner, or rhizome, is yanked from the surface of the soil; hence, the entire plant or section of a clone is harvested, rather than just the mature aerial stems as done for the ground pines (Nauertz and Zasada, 2015). Optimal lateral extension or growth for each rhizome has been recorded to occur in the year 1 (most recent year growing tip) to the year 6, with a maximum extension reaching 400 to 600cm. Greatest aerial stem mass was recorded in the years 3 to 6, with peak weights reaching 13 to 25 grams (Nauertz and Zasada, 2015). The conclusion of the present study observed that *Huperzia phyllantha* (Hook. & Arn.) can be successfully propagated through Bible methods of natural conditions (Fig.5). With further research is going on large scale production, *Huperzia* species in tissue culture method and development of propagation protocol.

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References

Cheng, D.H. and Tang, X.C. 1998. Comparative studies of huperzine A, E2020, and tacrine on behavior and cholinesterase activities. Pharmacol. Biochem. Behav.,60:377 - 86.

Wang, Z., Ren, G., Zhao, Y, et al.1999. A double-blind study of huperzine A and piracetam in patients with age-associated memory impairment and dementia. In: Kanba S, Richelson E (eds). Herbal Medicines for Nonpsychiatric Diseases. Tokyo: Seiwa Shoten Publishers, 1999, 39 - 50.

Ved, H.S., Koenig, M.L., Dave, J.R., et al.1997. Huperzine A, a potential therapeutic agent for dementia, reduces neuronal cell death caused by glutamate. *Neuroreport*., 8:963 - 8.

Skolnick, A.A.1997. Old Chinese herbal medicine used for fever yields possible new Alzheimer's disease therapy. *JAMA*, 277:776.

Benzing, D.H. 2012. Air Plants: Epiphytes and Aerial Gardens. Cornell University Press.

Maridass, M., Raju, G., Mahesh, R., Muthuchelian, K., Dharmar, K. and Abiya Chelliah,2011. *Ex situ* conservation of endemic fern allies, Huperzia hilliana (Spring) R.D. Dixit. *International Journal of Applied Bioresearch*, Vol. No.2: 1-6.

Kozikowski, A.P. and Tückmantel, W.2000. Chemistry, Pharmacology, and Clinical Efficacy of the Chinese Nootropic Agent Huperzine A. www.huperzine.net/invent.htm, 26 June 2000.

Hartmann, H.T., D.E. Kester, and F.T. Davies. 1990. Plant Propagation: Principles and practices. 4th ed. Prentice Hall, Upper Saddle River, NJ.

Cobb, B. 1963. A field guide to ferns and their related families. New York, NY: Houghton Mifflin Company.

Nauertz,E. A. and Zasada,J.C.2010. *Lycopodium*: growth form, morphology, and Sustainability of a Non-timber Forest Product. NTFP Conference Proceedings,pp.110-115. http://www.nrs.fs.fed.us/pubs/gtr/other/gtr-nc217/gtr_nc217page%20110.pdf.