Bioscience Discovery, 15(2):10-11, April - 2024

Open Access, Peer Reviewed, Referred Research Journal

Print & Online available on https://jbsd.in

ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)

Research Article

Conservation of *Cryptocarya amygdalina* Nees, through air-layering methods

Kalidass C*, Madhusmita Mallia and Prabhat Kumar Das

Taxonomy & Conservation Division,
Regional Plant Resource Centre, Bhubaneswar-751015, Odisha
**E-mail: kalidassindia@yahoo.com*

Plant conservation aims to prevent the extinction of plants. Conservation efforts preserve plants and their ecologies, so that future generations can appreciate our natural environment. Indigenous knowledge regarding the preservation and utilization of rare, endangered and threatened plant species is rapidly vanishing. Therefore, it is crucial to safeguard plant genetic resources to preserve biodiversity. *Ex-situ* and *in-situ* conservation methods can both use to protect plant genetic resources. *In-situ* conservation techniques such as rooting stem cuttings, grafting, hybridization and air-layering can help with the mass propagation of specific endangered medicinal plants as well as germplasm preservation. Air-layering is an effective and straightforward technique for plant propagation, especially for species that are challenging to root from stem cuttings (Blakesley and Chaldecott, 1993). Asexual reproduction, made possible through air-layering, has the advantage of preserving desirable traits, producing uniform rootstock and mass-producing identical plants quickly and efficiently (Eganathan *et al*., 2000). One endangered medicinal plant, *Cryprocarya amygdalina* Nees is known for its antioxidant, anticancer and anti-inflammatory properties (Ray *et al*., 2021). India considers the *C. amygdalina* plant, whose wood use to make tea boxes and other household items, to be an endangered species. Research on the spasmolytic properties of the bark extract was done by Dhar *et al*., 1973. The objective of our study was to assess how auxins affect *C. amygdalina* air-layering's ability to positively root. We are attempting to use air-layering as a preservation method, as there hasn't been any work done to date to aid in the preservation of this plant.

Random air-layering experiments on mature tree species were carried out to standardize the mass propagation of particular plants. The branches used for air-layering had diameters between 6 to 10 mm treated with IBA according to the standard method for solution preparation at concentrations ranging from 100 to 1000 and up to 5000 ppm. On each branch of the mature tree, lateral twigs within 1-2 meters of the apical buds were cut off and a rings of bark measuring about 2.5 cm were removed at a distance of about 40 cm from the branch apex. The ends of polyethylene sheet with a surface area of roughly 1200 cm, were wrapped around the basal portion and contain the layering site and then secured with plastic braces. Without the use of hormones as a control, the stem segments were approximately 20 cm long. This experiment maintained a dark, warm and humid environment while allowing for gas exchange. For each plant subjected to various treatments, the percentage of rooting, callus formation and root formation survival, which were regularly observed for up to 12 months, were noted. It is not surprising that the application of auxin enhances rooting ability and subsequent air-layer growth, as many other woody plants have also noted this effect, including studies conducted by Leaky *et al*., (1982), Leaky *et al*., (1990) and Teklehaimanot *et al*., (1996). In our experiments, air-layering was used. The control treatment resulted in non-responding rooting and the different IBA, IAA and NAA concentrations treated with 100 to 1000 ppm registered the lowest rooting success and subsequent survival of 10.00%. We observed that high concentrations of IBA and IAA in combination produced good results and subsequently, high survival rates (84.00%), as well as healthy roots with high length, greater thickness and a higher number of number of roots (Fig. 1), as compared with lower concentrations of IBA and IAA, which more often influence the number of roots formed. Our experiment revealed that the various IBA and IAA concentrations had different effects on the number of roots produced. IBA has been demonstrated in various studies (Krishnamoorthy, 1981; Chauchan *et al*., 1994; Hartman and Kester, 1997) to influence the development of adventitious roots by encouraging cell proliferation and enhancing the rooting potential of the air-layer. According to Chaudhary and Bhandari, (2021), for *Ficus* air-layered shoots, a combination of IBA and IAA treatments resulted in the highest rooting percentage (87.11%). The highest rooting percentage (86.67%) was achieved with a combination of IBA and IAA treatments, as shown by Singh and Sharma, (2020), who made a similar claim. Overall, we conclude that higher concentrations of IBA and IAA are generally more effective in promoting rooting in *C. amygdalina*, as evidenced by the higher survival rates (84.0%) and the development of healthy roots with greater length, thickness and number. In contrast, lower concentration of IBA and IAA appear to have greater effect on the number of roots developed, but may not result in the same degree of overall root quality. It's significant to note that root quality can be affected by a variety of factors, including hormone application techniques, environmental factors during the experiment, and the age or condition of the plant material used. Our finding suggests that optimizing the concentration of IBA and IAA for *C. amygdalina* could improve the efficiency and success of rooting, with potential implications for mass propagation and conservation efforts.

References

Blakesley D and Chaldecott MA, 1993. The role of endogenous auxin in root initiation. Part II: Sensitivity and evidence from studies on transgenic plants. *Plant Growth Regulation*, **13(1)**: 77–84.

Chauchan PS, Joshi NK, Bist HS and Thiman, 1994. Effect of growth regulators in rooting performance of some shrub species of Western Himalaya. *Indian Forester*, **120**: 105-109.

Chaudhary D and Bhandari K, 2021. Effect of different concentrations of IBA and IAA on rooting behaviour of air-layering shoots of *Ficus benghalensis* L., *Journal of Pharmacognosy and Phytochemistry*, **10 (4)**: 2789-2792.

Dhar ML, Dhar MM, Dhawan BN, Mehrotra BN and Ray C, 1973. Screening of Indian plants of biological activity: Part III. *Indian Journal of Experimental Biology*, **11(1)**: 43-54.

Eganathan P, Rao CS and Anand A, 2000. Vegetative propagation of three mangrove tree species by cutting and air layering. *Wetlands Ecology and Management,* **8(4)**: 281-186.

Hartman HT and Kester DE, 1997. Plant propagation: principles and practices. Englewood Cliffs: Prentice-Hall.

Krishnamoorthy HN, 1981. Plant growth substances. New Delhi: Tata McGraw-Hill Publishing company.

Leaky RRB, Champan VR and Longman KA, 1982. Physiological studies for tropical improvement and conservation. Factors affecting root initiation in cuttings of *Triplochiton scleroxylon* K.Schum. *Forest Ecology and Management*, **4**: 53-66.

Leaky RRB, Mesen JF, Tchoundjeu Z, Longman KA, Dick JMCP, Newton A, Matin A, Grace J, Munro RC and Muthoka PN, 1990. Low technology for vegetative propagation of tropical trees. *Commonwealth Forest Review,* **69**: 247-257.

Ray S, Chaudhary P and Singh MK, 2021. *In vitro* propagation of *Cryptocarya amygdalina* Nees, a medicinally important tree species of the Western Himalayas. *Journal of Forest Research,* **32(5)**: 2329-2337.

Singh R and Sharma N, 2020. Effect of IBA and IAA on the rooting of stem cutting of rose (*Rosa* spp.) cv. 'First Red'. *International Journal of Agriculture Sciences,* **12 (3)**: 7555-7559.

Teklehaimanot Z, Tomlinson H, Lemma T and Reeves K, 1996. Vegetative propagation of *Parkia biglobosa* (Jacq.) Benth. An undomesticated fruit tree from West Africa. *Horticulture Science,* **71**: 205-215.

Cite this article

Kalidass C, Madhusmita Mallia and Prabhat Kumar Das. 2024. Conservation of *Cryptocarya amygdalina* Nees, through air-layering methods. *Bioscience Discovery*, **15**(2):10-11.