ISSN 0975-6299 Vol 2/Issue 1/ Jan-Mar 2011

International Journal of Pharma and Bio Sciences

RESEARCH ARTICLE

BIOTECHNOLOGY

ROLE OF DIFFERENT REVIVE ROOTING HORMONES FOR EX-VITRO ROOTING OF ADHATODA *VASICA NEES*. & *BARLERIA PRIONITIS* L.

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ABSTRACT

The plants propagated by seeds are highly heterozygous thus; variations in genetic characters are to be expected. In vegetative propagation, unlike generative method, superior traits or characters of mother plants with respect to yield oil quality and disease resistance are conserved in their progenies, hence the study was undertaken. Effect of the different growth regulators (revive rooting hormones-Rootex) (Rootex-a, b, c; Natural Agrotech Indore.) on rooting of half-woody shoots of *Adathoda vasica* Nees. and *Barleria prionitis* L. were studied. Without stimulation, rooting in these medicinal plants occurred but after 7 weeks and after stimulation rhizogenesis takes 2 to 3 weeks. Growth regulators, with the exception of the preparation Rootex-c, showed a significantly stimulating effect on rhizogenesis, and effect of them declined in the order Rootex-a, Rootex-b and Rootex-c. The percentage of rooting in these medicinal plants *Adathoda vasica* Nees and *Barleria prionitis* L. was higher in preparations of 30gm/50 ml DW(Distilled Water) than that in other preparations in both cases of Rootex-a and Rootex-b. Poor rooting was found in the case of Rootex-c in all types of preparations. Rhizogenesis also varies according to the age of the plants, cutting, substrate, and conditions of cultivation.

ISSN 0975-6299 Vol 2/Issue 1/ Jan-Mar 2011

KEYWORDS

Adathoda vasica Nees; *Barleria prionitis* L. Plant growth regulators; Rooting; Cuttings.

INTRODUCTION

Adhatoda vasica Nees (Common name- Malabar nut; Family-Acanthaceae) is an evergreen shrub. It is well known for preparation of medicine for bronchitis, asthma and other pulmonary infections. *Glycodin*®, a famous product used for the cure of bronchitis is extracted from the leaves of this plant. It is also known for its anti-artritis, antiseptic, antimicrobial, expectorant, sedative and antituberculosis properties[5,18]. In Ayurveda, several medicines are manufactured by this plant. Due to increasing demand of *A. vasica* by pharmacies there is a need of its rapid multiplication.

Barleria prionitis L. is a herb common in India. It is found in many parts of the world, like USA, Australia, Indonesia, Malaysia, Philippines, Naharu. This plant is a member of Acanthaceae plant family. In Ayurveda the leaves and the tender branches are used for treatment of tooth ache, strengthening of gums, whooping cough and premature ejeculation. *Barleria prionitis* L. furnishes cover for wildlife and protects the soil against erosion. It is widely planted as an ornamental and cultivated in Asia as a hedge plant[1].

Plant growth regulators are frequently used in vegetative propagation to promote rooting of cuttings[2,7,4,21]. Preparations are based mostly on auxinoids[9, 8,16,6,10], retardants[3,23,12,17,22] and eventually their mixtures[19,14,15].

The present work summarizes the results of a one -year study of vegetative propagation of *Adhatoda vasica* Nees and *Barleria prionitis* L. under in vivo conditions, with a discussion of the effect of different factors in the rhizogenesis process.

MATERIALS AND METHODS

Plant material (Cuttings) from *Adhatoda vasica* Nees and *Barleria prionitis* L. were taken from mature old plants grew in the Botanical Garden of Govt. Motilal Vigyan Mahavidyalaya, Bhopal (M.P). These cuttings were cut to the length of 8 to 10 cm, with 2 to 4 leaves left, washed carefully with distilled water and treated with 0.1% bavistin for 10 minutes. Treatment to these cuttings was given by making different preparations of Rootex-a, Rootex-b and Rootex-c (Natural Agrotech Indore.) (preparations of 10 gm, 20 gm, 30gm 40 gm and 50 gm per 50 ml of distilled water).

The bases of the cuttings (50 to100 specimens per preparation) were treated with growth regulators tested (Table 1). The treatment in each case was given by dipping the basal part (1 cm) directly in the preparation. Control cuttings were immersed for the same time in distilled water. Afterwards the cuttings were planted in three substrates: sand + peat in the ratio 2:1 (s1), pure sand (s2) and pure peat(s3). The cuttings were maintained in a polyhouse at a day temperature 26 ± 2°C, relative air humidity 80 to 90%.

RESULTS AND DISCUSSION

The preparations of Rootex-a, Rootex-b and Rootex-c had a significant effect on rhizogenesis. Stimulated cuttings formed roots in 2 to 3 weeks, growth regulators with the exception of Rootex-c, had significant stimulatory effect on the rooting rate of the *Adhatoda vasica Nees*. and *Barleria prionitis* L. The effect declining in the order Rootex-a (60 up to 70%), Rootex-b (50 to 60%) and Rootex-c (05 to 30%) (Figure 1&2)(a-c); (Table1). Rootex-C did not significantly influence rhizogenesis and its effect, not

exceeding 30%, became apparent only in basal cuttings.

Table1

Effect of Revive rooting hormones on ex-vitro rooting of Adhatoda vasica Nees. And Barleria prionitis L.during ex-vitro propagation.

Revive rooting hormone (root-ex)		Percentage of cuttings producing roots + root production					
		Adhatoda vasica Nees.			Barleria prionitis L.		
		Type of cutting			Type of cutting		
Type of rootex	(gms/50mlDW) (distilled water)	soft	Semi-hard	hard	soft	Semi-hard	hard
Rootex-a	10	40++	50+++	45+++	35++	50+++	40++
	20	55+++	60++++	55+++	50+++	60++++	45+++
	30	**60++++**	**70++++**	**65++++**	**60++++**	**65++++**	**60++++**
	40	50+++	65++++	55+++	40++	55+++	50+++
	50	40++	45+++	35++	40++	40++	35++
Rootex-b	10	30++	40++	40++	35++	40++	30++
	20	50+++	55+++	45+++	40++	50+++	45+++
	30	**55+++**	**65++++**	**60++++**	**60++++**	**65++++**	**60++++**
	40	40++	45+++	35++	35++	45+++	40++
	50	30++	35++	25++	30++	40++	35++
Rootex-c	10	10+	15+	10+	15+	15+	10+
	20	10+	10+	05+	20+	30++	15+
	30	**20+**	**25++**	**15+**	**20++**	**30++**	**20+**
	40	10+	15+	10+	10+	15+	05+
	50	10+	15+	10+	10+	10+	05+

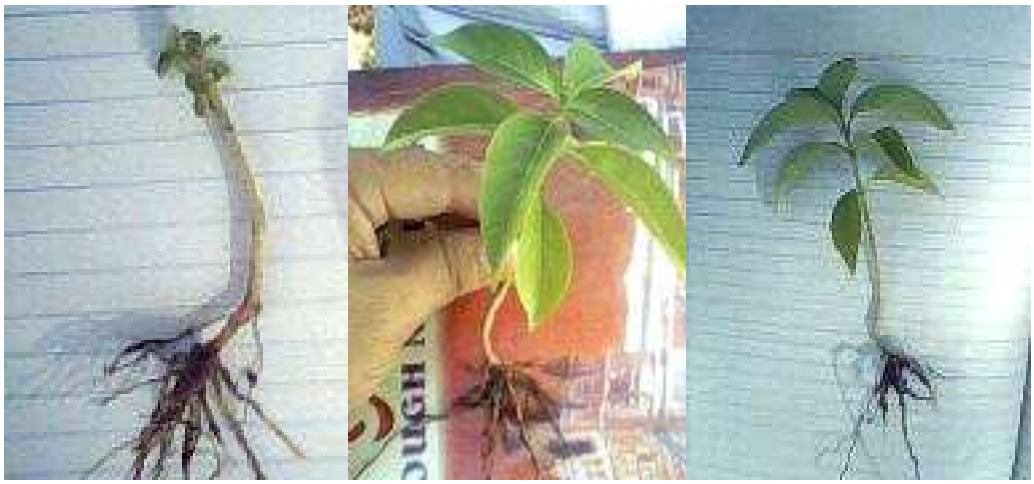
(+) sign indicates root production; + = Poor; ++ = Good; +++ = Very good; ++++ = Excellent

The production of adventitious roots in plants is controlled by growth substances[4], a key role in this process being played by auxins. According to Šebánek and Králik[17], the correlation had been found in plants between the content of their endogenous auxins and rooting ability. Hence, an exogenous application of synthetic auxinoids in the form of the preparations studied here may have reinforced the effect of endogenous auxins or directly induced rhizogenesis. The inter-specific difference has also been found in the propagation of poplars[11]. In *Adhatoda vasica Nees*. and *Barleria prionitis* L. a better rooting ability 60 to 70 % was achieved in the basal than in the apical cuttings using Rootex-a in the concentration of 30 gm/ 50 ml of distilled water. These Medicinal plants also had a superior rooting ability to Rootex -b, almost 55 to 65% of cuttings showing rooting ability. In both cases root production was also good.

It was better to leave the cuttings in the substrate and transplant them the next spring, however, the greenhouse temperature should not fall below 15°C, eventually the transplanted rooted cuttings should be transferred into conditions with a temperature upto 22°C to 25°C. A higher survival rate was achieved in with the combined substrate sand + peat than in pure sand or pure peat.(Fig 3&4)(a-c)

The type of growth regulator, as also the mode of stimulation decisively influenced the percentage of rooted cuttings. The rooting potential of the species differs and some species are weakly rooting such as Fagus and Betula[20], other are not rooting at all, such as

Magnolia stellata[10] and in *Adhatoda vasica Nees*. and *Barleria prionitis* L. rooting depends on stimulation. The preparations of Rootex-a and Rootex-b on the basis of several effective auxinoids and a short-term stimulation of 3 to 5 seconds, are more advantageous to *Adhatoda vasica Nees*. and *Barleria prionitis* L. On the other hand a 1-hour stimulation of the cuttings was less efficient with the preparation of Rootex-c. The use of Rootex-1 and Rootex-111 was also carried by Meera and Manjushri[13] in the ex-vitro rooting of *Garcinia indica Chios.*



1a 1b 1c

FIG 1(a-c)

Role of different synthetic rooting hormones on ex-vitro rooting of Adhatoda vasica Nees:
1a. Rooting of cutting treated with Rootex-a (30 gm/ 50 ml distilled water)
1b. Rooting of cutting treated with Rootex-b (30 gm/ 50 ml distilled water)
1c. Rooting of cutting treated with Rootex-c (30 gm/ 50 ml distilled water)

2a 2b 2c

FIG 2(a-c)

Role of different synthetic rooting hormones on ex-vitro rooting of Barleria prionitis L:
2a. Rooting of cutting treated with Rootex-a (30 gm/ 50 ml distilled water)
2b. Rooting of cutting treated with Rootex-b (30 gm/ 50 ml distilled water)

2c. Rooting of cutting treated with Rootex-c (30 gm/ 50 ml distilled water)

3a 3b 3c

Fig. 3(a-c)
Transfer of rooted plants of Adhatoda vasica Nees. into pots using different substrates.
3a. Growth of rooted plant using only peat as substrate
3b. Growth of rooted plant using only sand as substrate.
3c. Growth of rooted plant in combined substrate (sand+peat 2:1 ratio).

4a 4b 4c

Fig. 4(a-c)
Transfer of rooted plants of Barleria prionitis L. into pots using different substrates.
4a. Growth of rooted plant using only peat as substrate.
4b. Growth of rooted plant using only sand as substrate.
4c. Growth of rooted plant in combined substrate (sand+peat 2:1 ratio).

ACKNOWLEDGEMENT

We are very thankful to the Principal Govt. Motilalal Vigyan Mahavidyalaya, Bhopal (M.P.) for providing us lab facility. Thanks are also due to Department of Higher Education, Govt. of M.P.

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