

Asexual Reproduction of Jojoba by Air Layering¹

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Abstract. Jojoba [*Simmondsia chinensis* (Link) Schenider was air-layered using combinations of indolebutyric acid (IBA) and naphthaleneacetic acid (NAA). The highest percentage of rooting in pistillate clones was 0.002 M IBA + 0.02 M NAA, and in staminate clones was 0.02 M IBA + 0.02 M NAA. There was a significant difference in the percentage of rooting, but no difference in the number of roots between staminate and pistillate clones.

Problems in establishing jojoba in plantation crops (3, 11) include the number of years to fruiting (3 to 4 years) and the difficulty of determining sex expression (7). Asexual propagation methods such as stem cuttings (5, 6, 8), tissue culture (2, 9, 10), and air layering (1) have been suggested to overcome these problems.

Air layering is a means of rooting stems while the stems are still attached to the parent plant. A ball of moisture-retaining material such as peatmoss or sphagnum moss is placed around a section of stem which is usually wounded and wrapped tightly with polyethylene plastic sheeting; emerging roots grow into the moss (4). In the present paper we investigate the effects of IBA, NAA, and their combinations on root development in air layers of pistillate and staminate jojoba plants.

Jojoba plants were grown from wild seeds collected in areas around the Bay of La Paz, Baja California Sur, Mexico, and sown in an experimental plot at the Centro de Investigaciones Biologicas. These plants were 6 years old at the time of treatment. Air layerings were performed in winter (January 1981) on shoots with a diameter of 0.5 to 0.7 cm. A 2-cm-wide girdle was made 15–20 cm from the terminal end of the shoot to which a mixture of lanolin, containing rooting hormone at concentrations indicated in Table 1, was applied. The stem portions about the incisions were covered with 1:1 mixture of soil and vermiculite contained in 15 × 10-cm black polyethylene sheets with both ends tied. Each hormonal concentration was replicated 25 times for each sex, and each concentration was used only once on each plant. The plants were irrigated and the air layerings were moistened once a week with tap water. Roots were counted in layers after 100–113 days.

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Production of adventitious roots in jojoba increased in response to auxin. In pistillate plants, only 24% of stems rooted without auxin but 80% rooted with 0.02 M IBA, 75% rooted with 0.02 M NAA, and 91% rooted with both hormones combined (0.002 M IBA + 0.02 M NAA).

In staminate plants, only 13% of stems rooted without auxin but 50% rooted with 0.02 M IBA, 62% rooted with 0.02 M NAA, and 90% rooted with both hormones combined (0.02 M IBA + 0.02 M NAA).

The highest average number of roots was 32 with the application of 0.02 M IBA + 0.02 M NAA in pistillate plants; in staminate plants the highest average was 37 with the application of 0.2 M IBA. Auxin also increased the number of roots.

Pistillate plants rooted significantly better (5% level) than staminate plants, but there was no difference in the number of roots per plant between sexes. The plants were in the flowering stage at the time of the air layering, and flowering was partially inhibited by the air-layering treatments.

Our results indicate that air layering of jojoba is a successful method of asexual propagation and that rooting may be improved with a combination of IBA and NAA applied to the girdle.

Table 1. Rooting of air layers of staminate and pistillate jojoba in response to IBA and NAA. Each combination was applied to 25 layers.

IBA concn (M)	Rooted layers (%)						No. of roots/plant					
	NAA concn (M)						NAA concn (M)					
	0	.0002	.002	.02	.2	Avg	0	.0002	.002	.02	.2	Avg
<i>Pistillate plants</i>												
0	24	29	38	75	4	34	6	5	5	24	5	9
.002	50	55	61	91	4	52	4	9	10	19	4	9
.02	80	47	46	77	4	51	12	17	28	32	3	19
.2	37	5	40	52	4	28	19	2	21	25	13	16
Avg.	48	34	46	74	4	41	10	8	16	25	6	13
<i>Significance:</i>	NAA: F = 14.22**			IBA: F = 4.17*			NAA: F = 6.89**			IBA: F = 3.48		
<i>Staminate plants</i>												
0	13	4	44	62	17	28	5	6	7	17	18	11
.002	19	15	35	57	0	25	7	7	7	27	0	9
.02	50	14	76	90	12	48	14	5	8	22	23	14
.2	40	5	55	38	0	28	37	7	16	33	0	19
Avg	31	10	53	62	7	33	16	6	10	25	10	13
<i>Significance:</i>	NAA: F = 16.20**			IBA: F = 3.87*			NAA: F = 2.49			IBA: F = 1.02		

*,**F significant at 5% (*) or 1% (**) level.

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