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Propagation *in vitro* of Chinini (*Persea schiedeana* Nees)

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Summary

Stem segments of *Persea schiedeana* cultivated from seeds were pretreated under three light conditions (darkness, partial, and total light), and incubated in a MS medium with different concentrations of IBA alone or in combination with K. To establish *P. schiedeana in vitro,* it is neither necessary for the inoculant plantilles to receive a pretreatment with darkness, partial, or total illumination; nor is it necessary to add activated charcoal to the base medium. The growth of axillary bud was observed in a medium made up of 0.1, 1.0, and 0.01 mg/l of IBA. Bud growth with leaf expansion with 1.0 mg/l of IBA plus 0.3 mg/l K, 3.0 mg/1 of IBA and 1.0 mg/l of K, and 3.0 mg/l of IBA plus 0.01 mg/l of K. Complete plantilles were generated in a medium with 1.0 mg/l of IBA and 1.0 mg/l of K.

Introduction

Persea schiedeana is commonly known as "chinini", "coyo," and "chucte" (8 and 10), being found throughout such countries as Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama (1, 5, 9, and 14). In Mexico, *P. schiedeana* is distributed throughout the states of Chiapas, Oaxaca, Puebla, Tabasco, and Veracruz (1, 5, 8, and 16).

P. schiedeana is not presently of economic significance for commercial use in Mexico. Vigorous trees of acceptable production are found in near-wild conditions. The constant search for grafting stocks for avocado with the proper characteristics for adverse cultivating conditions, as well as the rustic nature of the conditions in which *P. schiedeana* develops, have motivated various researchers to include this species in their genetic improvement work.

Compatibility studies indicate that *P. schiedeana* has excellent compatibility with *P. americana* (2, 3, 6, and 11). In field conditions, the fungus *Phytophthora cinnamomi* (a cause of root rot in avocado) has frequently been isolated from soil where *P. schiedeana* trees grow (16 and 17). Upon evaluating the resistance of *P. schiedeana* plantilles to *P. cinnamomi,* authors mention that on some occasions it was very susceptible (14), while on others it showed good possibilities (15).

P. schiedeana has demonstrated better tolerance to clay soils than *P. americana* (2) and some genotypes of *P. schiedeana* have shown promise in the resistance to, or tolerance of, excessive quantities of chlorides (13). The present study establishes the

conditions for root induction and axilary bud development in stem segments of *P. schiedeana,* exploring the possibility of later propagation and its potential for use as a rootstock for *P. americana.*

Materials and Methods

The material used in this experiment was provided by the Fruit Research and Development Unit of the Puebla Plan, which belongs to the Training and Research Center for Regional Agricultural Development of The Colegio de Postgraduados located in Atlixco, Puebla, Mexico.

Persea schiedeana plantilles grown from seeds to a length of 30 cm with 20 to 30 buds were distributed in groups of 10 and given the following pretreatments: continuous illumination (8500 lux), partial illumination (500 lux), and darkness, each a thirty-day period.

The stems of the plants were submerged in ethanol at 70% (v/v) for 1 minute, sterilized in calcium hypochloride at 4% (v/v) for 20 minutes, and rinsed well with distilled, sterilized water. The aseptic stems were divided into 1 cm segments with one bud and placed in a Murashige and Skoog medium (7) complemented with indolebutyric acid (IBA) alone or in combination with kinetin (K) only in different concentrations. Each treatment consisted of 100 tubes with one bud each, with 3 repetitions.

The stem segments were incubated at a temperature of 27°C ± 1°C and were exposed to 16 hours of light (intensity 8500 lux) and 8 hours of darkness.

Results

As opposed to *P. americana* var. *Antillana* (4), no differences were found in *P. schiedeana* to indicate that pretreatments of darkness, or partial, or total illumination might favor the growth of axilary buds or root induction.

Root induction was observed in a MS medium with or without the addition of activated charcoal. However, it was noted that roots were more vigorous and of greater number in the absence of activated charcoal; there was bud growth and the leaves experienced normal expansion (Fig. 1). In the medium with activated charcoal, roots were less vigorous and less numerous, but without axilary bud growth (Fig. 2).

IBA concentrations of 0.01, 0.3, and 1.0 mg/l produced little bud growth and no leaf expansion (Fig. 2); upon combining the IBA with K, both leaf development and root formation were induced. Concentration of IBA (0.3 mg/l) induced little bud growth, with the formation of callus material at the base of the stem segment.

Excellent axilary bud growth and leaf expansion were observed in the concentrations IBA (1.0 mg/l) plus K (0.3 mg/l), IBA (3.0 mg/l) plus K (1.0 mg/1), and IBA (3.0 mg/l) plus K (0.01 mg/l) (Fig. 3).

Roots formation was obtained in IBA (0.3 mg/l) and K (3.0 mg/l), along with the formation of callus on the base of the segment.

Complete plantilles were obtained in the treatments of IBA (1.0 mg/l) plus K (3.0 mg/l) (Fig. 4).

These were later successfully transferred to greenhouse soil (Fig. 5).

The effects induced by the IBA and kenetin are shown in Table 1.

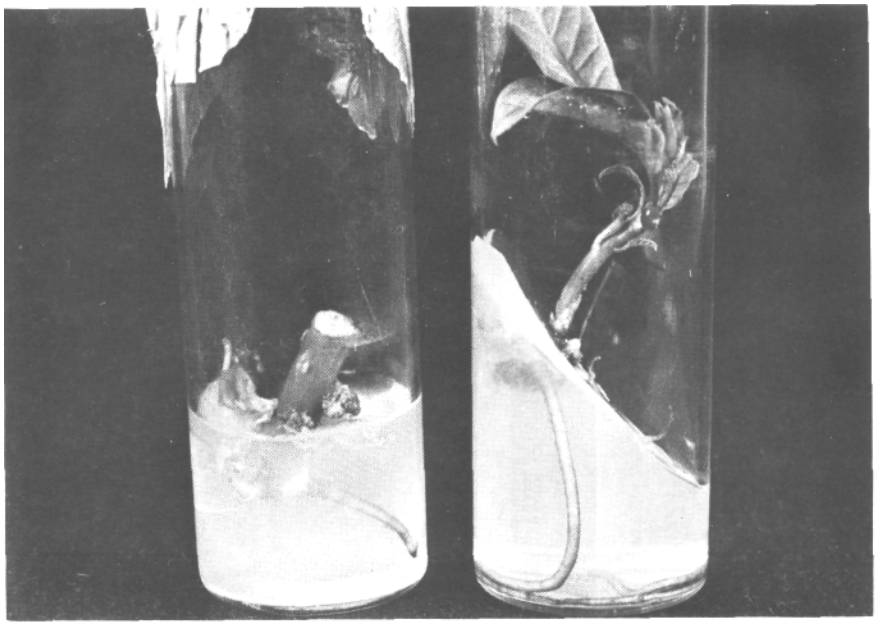

Figure 1. MS medium without activated charcoal; root development and vigorous leaf growth can be observed.

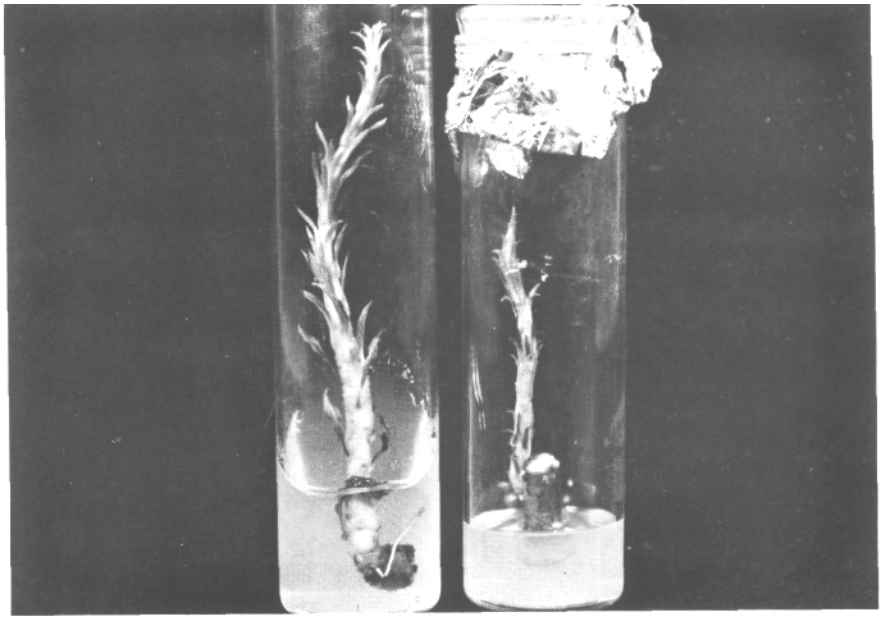

Figure 2. Explant grown in MS medium with activated charcoal; less vigorous root development and only partial leaf growth are evident.

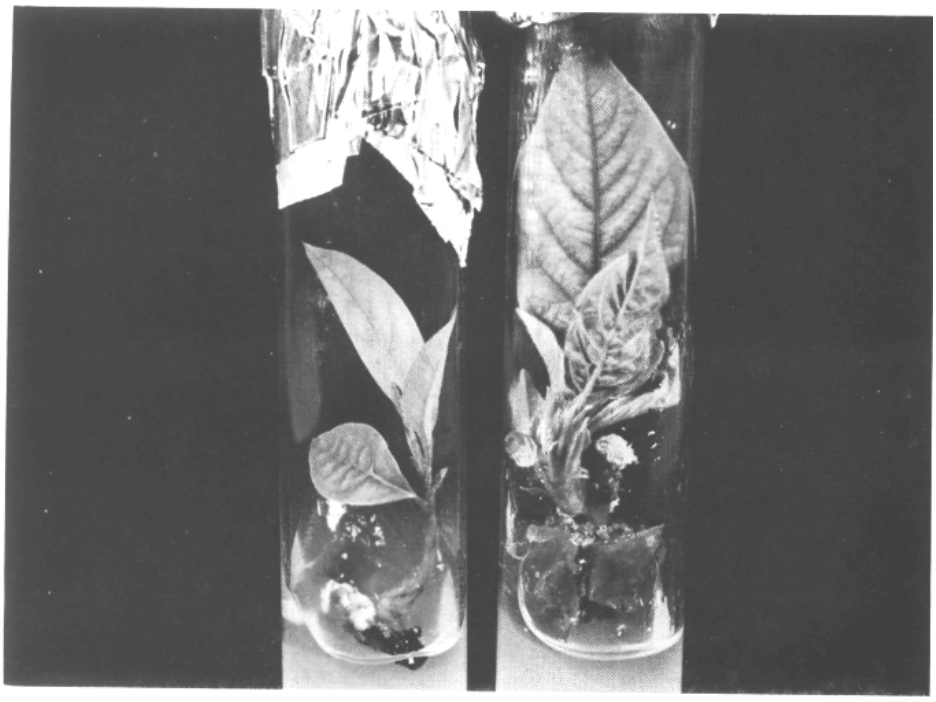

Figure 3. Leaf development in MS medium without activated charcoal.

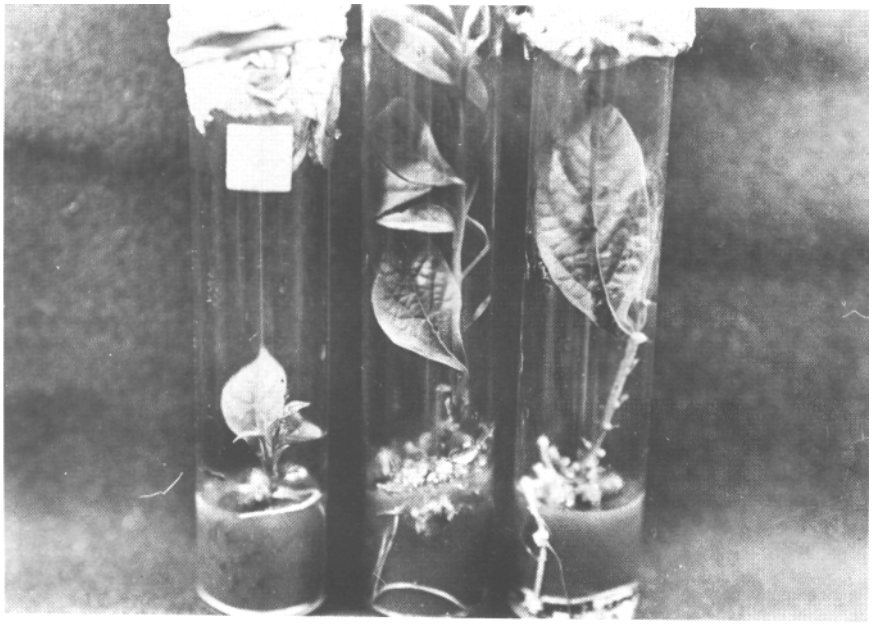

Figure 4. Plantules obtained in MS medium with activated charcoal; weak root growth as well as callous material at the base of the stem, can be seen.

Figure 5. Plantules cultivated originally in vitro and transplanted, after two months in soil.

Discussion

The results observed in this study agree with those given by other researchers (4 and 12) in that induction is accompanied by the formation of callus on the base of the inoculant, even when the presence of callus on some roots is not externally observed.

On the basis of the preliminary study, it would be possible to produce complete plantilles of *P. schiedeana* and also the propagation of genotypes with the goal of using as a rootstock for *P. americana,*

As far as we know, in this experiment, *P. schiedeana* tissue was successfully established *in vitro* for the first time.

Table 1. Effect of IBA alone or combined with kinetin on *P. schiedeana* stem segments

Treatments (mg/l) Auxin IBA	Cytokinin Kinetin (K)	Response
0.1	--	Bud growth (+) with callus on the base
1.0	--	Bud growth (+++) without leaf expansion
0.01	--	" " "
1.0	0.3	Bud growth (+++) with leaf expansion
3.0	1.0	" " "
3.0	0.01	" " "
1.0	1.0	Complete plantules (+++)
1.0	3.0	" " "
0.3	3.0	" " "

\+ Bud growth (5 mm)
+++ Bud growth (5 cm)

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