Selecting and Propagating Rootstocks to Produce Apricots

Stephen M. Southwick[1] and Kitren G. Weis[2]

ADDITIONAL INDEX WORDS. *Prunus armeniaca*, *Prunus* sp., interstock, adaptation, compatibility

SUMMARY. Selection and propagation of rootstocks for apricot (*Prunus armeniaca* L.) varies worldwide in response to local climate, soils, and cultivars. In this paper we review published research focused on these local selective practices. Additionally, we review the current development of apricot rootstocks and suggest new research avenues to satisfy the needs of commercial apricot growers. Rootstocks are identified by their responses to biotic and environmental stresses, with specific adaptive characteristics that enable establishment and production under unique zonal ecologies. Desirable characteristics include scion compatibility, adaptation for heavy or wet soils, pest and disease resistance, ease of propagation, control of vegetative vigor, effects on dormant season physiology of the scion, precocity, fruit quality, and productivity. Interstocks that can overcome incompatible rootstock–scion combinations are covered. As worldwide consumer demand for apricots increases with improved apricot cultivars, rootstock selections and propagation must be developed for niche fruit with specific characteristics, intensive production systems, mechanized harvest, and marginal site selection.

Selecting a rootstock for a chosen scion cultivar depends primarily on site-specific needs. As apricot cultivation expands into marginal sites, the challenge for growers, breeders, and researchers is to develop and identify rootstocks that are either specific in their adaptation or broadly adapted to many growing situations. While scions can be changed by regrafting, rootstocks remain constant throughout the life of the orchard. Appropriate rootstock selection is thus crucial. Traits considered most important in rootstock selection include compatibility with scion; adaptation to soil and climatic conditions; tolerance of oxygen stress; ease and uniformity in propagation; influence on vegetative vigor; precocity, consistent cropping and yield, and fruit quality; winter hardiness; suckering tendency; and sensitivity to disease, pests, and replant problems.

Rootstock selection

The choice of rootstock is dictated by local conditions, particularly of soil and climate (Table 1). Once compatibility with locally used cultivars is established, rootstocks may be evaluated for other influences. Local needs, such as cold-hardiness, bloom delay for frost protection, and resistance to site-specific disease (e.g., *Armillaria* spp.), dictate the best choice for a particular site. The foremost barrier to using apricot rootstocks in a given location is the apricot's lack of adaptation to heavy wet soils (Rom, 1991). Many adaptive traits that *P. domestica* and *P. cerasifera* impart on high-budded stocks such as winter hardiness (Crossa-Raynaud and Audergon, 1987; Paunovic, 1977) could have wide application throughout apricot-growing regions of the world. Of the available rootstocks, many have not been critically evaluated for disease resistance or horticultural performance over wide ranging conditions.

Soil and climate adaptation

Apricot seedling rootstocks, like most peach rootstocks, are limited to light, well-drained, neutral-pH soils that are relatively low in lime (Table 1). In areas with heavy soils, a high water table, or late or long rains, root asphyxiation, and oxygen stress limit the use of apricot and peach rootstocks. *Prunus insititia*, *P. domestica* (Rom, 1991), Marianna, and myrobalans (Crossa-Raynaud and Audergon, 1987; Vachun, 1995) can tolerate 10 to 60 d of root asphyxiation in summer, depending on cultivar and species, and 120 to 145 d of water immersion in winter compared to 70 to 75 d for apricot and 80 to 85 d for peach. Other characteristics of soil–plant interaction that dictate rootstock selection are buffering ability for soil pH (myrobalan tolerant of alkaline soils; Paunovic, 1978) and nutrient uptake efficiency (Bojic and Paunovic, 1988). Recently, Rosati et al. (1996) found that apricot on 'Citation' rootstock had reduced leaf N and Zn levels compared to 'Marianna 2624' and speculated reduced N and Zn uptake. These authors suggested that higher N and Zn fertilization would overcome reduced leaf nutrient levels. Anchorage is a concern in many apricot-producing regions. Rooting depth impacts a tree's ability to remain standing after repeated storm impact; 'Hungarian Best' apricot has a more extensive root system than myrobalan when grown in Serbian Yugoslavia (Mitrevski and Ristevski, 1991). Peach seedling and myrobalan seedling stocks usually display good anchorage characteristics.

Some rootstocks display variable compatibility with scion cultivars. On sandy South African soils, 'Royal' is completely compatible with peach and apricot seedling stocks and hardwood cuttings of 'Marianna' plum; 'Bulida', however, performed best on apricot seedling (Stadler and Stassen, 1986). Incompatibility responses included low yield, break at the graft union, and high prevalence of bacterial canker. Only by long-term testing of different rootstocks on specific soils with desired cultivars can best choices be made. Using interstocks in some instances has proved effective in bridging otherwise incompatible scion–rootstock combinations (Table 3).

Size control, vigor control, and fruitfulness

Size-controlling rootstocks have been developed to reduce vegetative vigor of rootstock and scion, while maintaining high production. Smaller trees facilitate high density planting, mechanized pruning and harvest, and other reductions of management costs. Apricot rootstocks tend to impart vigor. 'Citation', a plum x peach hybrid developed by Zaiger Genetics, Modesto, Calif., and 'Ishtara' (Bernhard and Duquesne, 1988) produce smaller apricot trees in certain situations. 'Torinel' (Avifel) plum, myrobalans (Apoyan et al.,

[1]Extension pomologist, Department of Pomology, University of California, Davis, CA 95616; e-mail: smsouthwick@ucdavis.edu.

[2]Staff research associate, Department of Pomology, University of California, Davis, CA 95616; e-mail: kgweis@ucdavis.edu.

The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access

Table 1. Rootstocks used in apricot culture (not all-inclusive). Following the rootstock name is the common name or cultivar, preferred application and advantages to use, problems, and citations.

P. armeniaca L.
Apricot seedlings; Canino, Tilton, Royal/Blenheim, Khargie, Manicot (GF 1236), Canino, Haggith
Well-drained soils, low temperature tolerant, frost hardy; good productivity, resistant to nematodes, doesn't sucker
Heavy, wet, alkaline or saline soils, excess vigor; delayed genetic weaknesses in selfed cultivars, nonprecocious, CLS-incompatible, susceptible to *Armillaria, Pseudomonas*
Forte, 1987; Hassen and Catlin, 1984; Grassi et al., 1978; Lichou and Audubert, 1989; Monastra and De Salvador, 1995; Vachun, 1995

P. cerasifera J.F. Ehrh. [*P. myrobalana* (L.) Loisel.]
Cherry plum, myrobalan seedling; Myrobalan B, GF-31, 2032; Myrobalan 29C; Ademir (OP seedling of Myrobalan)
Physical 'resistance' to stemborer; wide soil adaptation; improve winter hardiness with high-budding; advance harvest; Ademir reduces vigor, adaptive to heavy and calcareous soils, resistant to iron chlorosis and root asphyxia
Low yield, nonuniform and nonvigorous growth, incompatibility, suckers, susceptible to *Pseudomonas* ssp.
Apoyan et al., 1985; Costa and Grandi, 1975; Crossa-Raynaud and Audergon, 1987; Lichou and Audubert, 1989; Moreno et al., 1995b; Paunovic, 1977

P. cerasifera x *P. munsoniana* F.W. Wight & Hedr.
Wild-goose plum; GF 8-1, Marianna 2624
Wide soil adaptation, vigorous and productive, limited interstock use for Myro root/*P. domestica* trunk/high scion budding (virus-free); resistant to water-logging and pests; improved productivity; used on shallow and saline soils, resistant to *Meloidogne incognita* nematode; *Armillaria* tolerance
Limited compatibility, susceptible to *Pseudomonas* ssp. and *Pratylenchus vulnus*
Crossa-Raynaud and Audergon, 1987; Lichou and Audubert, 1989; Paunovic, 1978; Rom, 1991; Stassen and Hurter, 1981; Stassen and Stadler, 1983; Terblanche et al., 1974

P. cerasifera x *P. salicina*
Myrobalan GF 31
Imparts vigor and improves fruit quality and quantity; N. Italy and France
Compatibility variable
Lichou and Audubert, 1989; Sansavini and Montevecchi, 1986

P. domestica L.
European plum, Green Gage, Reine Claude GF 1380, Arda, B1-Cack, B1-4 Belosljiva, Torinel (Avifel), Brompton E.M., Julior, Prunier GF 43
Good compatibility with some cultivars, vegetatively propagated, adjustable budding height; improve longevity and cropping; improve winter hardiness with high-budding; Torinel resistant to *Meloidogyne* nematodes and reduces vigor and fruitfulness, resistant to *Verticillium*
Heavy soils, water logging, suckers (except Torinel)
Audergon et al., 1991; Crossa-Raynaud and Audergon, 1987; Egea et al., 1991; Lichou and Audubert, 1989; Paunovic, 1977; Vachun, 1995

P. domestica, cerasifera, or *salicina* x *P. persica*
Ishtara (Ferciana), Citation (=*salicina* x *P. persica)*, Myran vigorous, tolerates *Armillaria* and *Meloidogyne* nematodes, intermediate tolerance to root asphyxia; compatible; precocious, high yielding, size controlling
Only slightly tolerant of heavy soils, susceptible to crown gall (*Agrobacterium* spp.)
Lichou and Audubert, 1989; Renaud, 1993

P. insititia L.
Damas GF 1869, Polizzo de Murcia, Perla, Buburuz, Albe Mici, Kozlienka, Pixy, Adesto 101 (OP seedling of Pollizo de Murcia
High productivity and vigor, frost hardy, possible tolerance to *Pseudomonas*, wide soil adaptation; increases fruit color (cv Kozlienka); cv Fhér Bystercei reduces vigor and early decline while improving yield; Spain, Romania, Serbian Yugoslavia; Adesto reduces vigor with increased cropping efficiency and fruit size, tolerates heavy, calcareous wet soils and is resistant to *Meloidogyne*
Limited commercial usage; dormancy delay; harvest delay (cv Kozlienka); suckers
Egea et al., 1991; Lichou and Audubert, 1989; Moreno et al., 1995a; Nitransky, 1978, 1981, 1983; Vachun, 1995

P. mume
Japanese apricot
Low chilling, resistant to crown gall, *Armillaria*, nematode
Not widely tested
Smith, 1928

P. persica L (Batsch.)
Peach, Halford, Lovell, Golden Queen, Bailey, Siberian-C, Nemaguard, Nemared, GF-305, Elberta, Higama, Rubira, Montclar
Good vigor, good compatibility with local cultivars; some resistance to bacterial canker and *Verticillium*; Nemaguard & Nemared have root-knot nematode resistance; improved productivity; doesn't sucker; Europe (N. Rhône especially), N. & S. America
Some incompatibility, slow vegetative growth, low productivity, heavy or alkaline soils, sensitive to crown-gall and *Phytophthora*
Duquesne, 1980; Grassi et al., 1978; Lichou and Audubert, 1989; Teviotdale et al., 1989; Vachun, 1995

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access

1985; 'Ademir', Moreno et al., 1995b), and *Mycrocerasus pumila* x *P. armeniaca* hybrid (Eremin, 1988) rootstocks were also developed for their size-controlling ability. 'Torinel' increases fruitfulness, as can 'Adesoto 101' (Moreno et al., 1995a), but other size-controlling rootstocks may not affect fruitfulness compared to production on standard-sizing stocks, and some size-controlling stocks may reduce productivity ('Pixy'; Vachun, 1995). Southwick and Yeager (1998) have shown that 'Citation' can improve fruit size and production of 'Royal'/'Blenheim' cultivar compared to 'Royal/Marianna 2624'.

Resistance to diseases and pests and suckering

Nematode prevalence in orchard replanting may dictate use of resistant rootstocks. *Prunus armeniaca* is highly resistant to *Meloidogyne* species; 'Ishtara', 'Torinel', 'Nemaguard', and 'Nemared' (peach) rootstocks are also resistant. Of the commercial apricot rootstocks, 'Torinel' was a poor host for root lesion nematode (*Pratylenchum vulnus*; Alcañiz et al., 1996). Other rootstock selections may be made for resistance to *Armillaria*, *Agrobacterium tumefaciens*, stemborer, and to *Verticillium*. Peach is more sensitive to *Phytophthora* root rot than plum; both rootstocks respond well to cultural management of this problem (Teviotdale et al., 1989). No rootstocks demonstrate adequate resistance to *Pseudomonas* spp. However, results in France suggest that high budding of the rootstock (≈75 cm or more) reduced the incidence of bacterial canker on apricot (J.-P. Prunier, personal communication). A similar observation has been made for French prune growing on myrobalan 29c rootstock in California (Southwick et al., 1997). The problem with high budding is the possible reduction in the ease of picking fruit from the ground or with small ladders. Rootstocks that sucker excessively may contrib-

Table 2. Compatibility of various rootstocks used in apricot cultivation. Following the rootstock are compatibility with scion, constraints, and citations.

P. armeniaca seedling
Most are highly compatible
Paunovic, 1977; Vachun, 1995

'Canino', 'Monqui', 'Rouge de Roussillon'
Compatible with a small group
Rarely used; partial incompatibility resulting in breaking at graft; CLS (chlorotic leaf spot virus) imparts incompatibility
Vachun, 1995

'Bergeron', 'Hungarian Best', 'Velkopavlovická', 'Cafona', 'Erevani', 'Bulida', 'Perfection', 'Roal', 'Stark Early Orange'
Compatible with wide range of cultivars
Vachun, 1995

P. cerasifera Ehrh. 'MY-VS-1'(Slovakia), 'Dzanka 4' (Bulgaria), 'GF 31' (France)–seeds
Compatible with most apricots; some incompatible cultivars; Ademir has variable compatibility
Djuric, 1990 (reviewed in Vachun, 1995); Moreno et al., 1995b

P. cerasifera x *P. munsoniana* (Marianna plum)–cuttings
Compatible with most apricots
'Peeka' and 'Bulida' break at graft union

P. domestica 'Arda' (Bulgaria), 'St. Julien A' and 'GF 8-1' Marianna (France), 'Fehér Bystercei' (Hungary), 'Torinel' ('Avifel')
Compatible with most apricots
Vachun, 1995

P. dulcis, dulcis x *persica*
Incompatible with most apricots
Vachun, 1995

P. insititia 'Belosliva' (Yugoslavia)
Compatible with most apricots
Vachun, 1995

P. mume
Compatible with 'Bulida' apricot
Limited use with replant problems; difficult to propagate
Stadler and Stassen, 1986

P. persica
Compatible with most apricots
Vachun, 1995

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access

ute to a higher incidence of plum pox virus as well as increase management costs. *Prunus armeniaca* does not sucker, nor does *P. persica*. However, suckering is a problem with Marianna, myrobalan, and cultivars of *P. insititia*.

Precocity, harvest date, and fruit quality

Southwick and Yeager (1998) showed that 'Citation' improved the mass of fruit harvested in the first picking compared to similar yielding and trained trees on 'Marianna 2624'. Some *P. cerasifera* stocks advance harvest date, while other *P. cerasifera* hybrids improve productivity and fruit quality (Sansavini and Montevecchi, 1986; Stassen and Hurter, 1981). Incompatibility, however, limits the use of these stocks. 'Adesoto 101' (Moreno et al., 1995a) advances fruit maturity in peach cultivars compared to peach on peach seedling; however, harvest advance has not been reported in apricot.

Compatibility and the use of interstocks

Incompatibility remains the most important constraint to using rootstocks other than apricot seedlings Tables 2 and 3). Complete incompatibility of apricot with apricot seedling rootstocks is rare, but has been reported when CLS (chlorotic leaf spot) is present (Bernhard-Dunnes, 1970). Incomplete incompatibility has been reported when grafts fail through break-off of the scion (Paunovic, 1977). When other *Prunus* species are screened for compatibility, rootstocks and scion cultivars may be separated into two groups based on compatibility over a wide or narrow range; i.e., a rootstock may be compatible with a narrow or wide range of cultivars, as may a given cultivar with a narrow or wide range of rootstocks. Often, compatibility with locally grown apricots is found in locally developed rootstocks from other *Prunus* species, as in 'My-VS-1' (Slovakia), 'Dzanka 4' (Bulgaria), 'GF 31' (France), and 'Marianna 2624' and 'Citation' (United States).

Incompatibility is complex, ranging from complete (failure of buds to take) to incomplete, resulting in early decline, arrested growth, or dormancy delay (Guerriero and Scalabrelli, 1984). Reduced productivity has also been attributed to incompatibility (Rom, 1991). In Spain 'Bulida' differed by >100% in cumulative production on two different rootstocks over 6 years (Egea et al., 1991). *Prunus armeniaca* and peach rootstocks have also been developed to increase yield efficiency (Grassi et al., 1978; Stassen and Hurter, 1981).

Several physical characteristics of incompatibility have been identified, including vascular discontinuity between rootstock and scion and bark and wood discontinuity with reduced translocation. Incompatibility has also been ascribed to viruses (Crossa-Raynaud and Audergon, 1987). Early detection methods for graft incompatibility must address the high variability in the response and the development of the response over a long period of time (Ermel et al., 1995). Ultimately, an interstock may be used to overcome incompatibility. For further reading, see Crossa-Raynaud and Audergon, 1987; Jakubowski and Zdyb, 1995; Ogasanovic, 1995; Ogasanovic et al., 1991; Paunovic, 1978; Salazar et al., 1991; and Vachun, 1995.

Propagation

Rootstocks are produced from seed (sexually) and cuttings (vegetatively) (Table 4). While apricot rootstocks are readily produced from seed—as are plum, peach, and certain interspecific hybrids—many rootstocks are vegetatively propagated from hardwood or softwood cutting or, to a very limited

Table 3. Use of interstocks to reduce incompatibility response in apricot culture. Following rootstock are cultivar of scion, interstock, application or adaptation, country, and citations.

P. cerasifera Myrobalan	Kishinevskaya Rannyaya, Melitopolskii Ranii, Frühmarille aus Kittsee	St. Julien A, Cacanska Lepotica apricot, *P. domestica*	Overcome dieback; heavy and regular bearing; good fruit quality (apricot), high scion budding for virus-free wood (*P. domestica*)	Yugoslavia (Serbia)	Ogasanovic et al., 1991; Paunovic, 1978
P. dulcis var. *amara*, bitter almond	No cultivar listed	Peach	Resistance to *Capnodis tenebrionis* L. in dry culture	Spain	Salazar et al., 1991
P. domestica B1-Cacak, B1-Belosljiva (and B2-, B3-, B4-) B1-4 selections from 'Belosljiva'	Various	*P. domestica* B1-Cacak, B1-Belosljiva (and B2-, B3-, B4-) B1-4 selections from 'Belosljiva'	Overcome dieback; heavy and regular bearing	Yugoslavia (Serbia)	Ogasanovic, 1995
Various	Various	*P. cerasifera* ssp. *divaricata*	Reduce tree size	Poland	Jakubowski and Zdyb, 1995

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access

degree, by micropropagation (e.g., shoot tip grafting or rooting of cotyledons; Ambrozic et al., 1992; Lane and Cossio, 1986; Lichou and Audubert, 1989; Snir, 1984). Various researchers have reported improved rooting with GA (gibberellic acid) or IBA (indolebutyric acid) and bottom heat (Chao and Walker, 1966; Cupidi, 1992; Hassan et al., 1991; Nicotra, 1981). Breeding programs should address cost, ease of propagation, uniformity of progeny, and freedom from virus.

Future trends

Ideally, rootstocks should be widely adapted. To be widely adapted, rootstocks must be compatible with apricot cultivars, tolerate a range of soil conditions and be cost effective to produce. Climatic adaptation is likely to be important since fruit growing opportunities exist in extreme locales. For example, low-chilling cultivars should be complemented with low-chilling rootstocks. The same would be true for areas where cold-hardiness can determine ultimate success or failure. Seed-propagation can reduce costs but requires high germination percentages. Size-controlling rootstocks should be homogenous in performance and produce few or no suckers. Nematode resistance will likely become more important because soil fumigants used to control nematodes are

Table 4. Propagation methods for rootstocks used in apricot cultivation. Following method are species, material and ease of propagation, and research.

- Germination of seed
  - *P. armeniaca*
    - Wild apricots, local commercial/easy
    - Use of GA (Chao and Walker, 1966)
  - *P. cerasifera*
    - Seed from mother rootstock tree; easy
  - *P. cerasifera* x *P. salicina* (GF31)
    - N. Italy, France
  - *P. persica*
    - Seed from cropping cultivar or from rootstock tree/easy
    - Use of GA (Chao and Walker, 1966)
  - *P. insititia*
- Clonal: softwood and hardwood cutting (suckers, shoot material)
  - *P. armeniaca*
    - Difficult; rarely used; enhanced by IBA
    - Hassan et al., 1991; Nicotra, 1981
  - *P. cerasifera*
    - Suckers, hardwood cuttings (Ademir, easy)
    - Moreno et al., 1995b
  - *P. cerasifera* x *P. munsoniana*; *P. insititia* (pollizo prune, Adesoto 101)
    - Suckers, hardwood cuttings, easy
    - Moreno et al., 1995a
  - *P. domestica, cerasifera,* or *salicina* x *P. persica*
    - Ishtara (Ferciana)
    - France
  - *P. glandulosa, P. microcerasus, P. pumila, P. tomentosa*
    - Israel (Eremin, 1988)
  - *P. persica*
    - Softwood cutting (also by seed)
    - 'Chanturgue Montclar' (Maidebura and Kniga, 1986)
- Unspecified clonal
  - *P. cerasifera, P. cerasifera* x *P. munsoniana, P. cerasifera* x *armeniaca, P. mume*
    - Unspecified or hardwood cutting/easy
    - France, Yugoslavia (Serbia), S. Africa
  - *P. domestica* cv Belosljiva; Marianna
- Micropropagation—rooting, micrografting
  - *P. armeniaca*, Torinel plum, Reine Claude GF 1380
    - Cotyledons, shoots
    - Ambrozic et al., 1992; Audergon et al., 1991; Lane and Cossio, 1986; Lichou, 1989; Marino et al., 1991; Snir, 1984
- Micrografting of virus free rootstock/shoot apex of apricot (e.g., Nemaguard peach or Canino apricot)
  - Shoot tip grafting to rootstock seedling (STG)
  - Cupidi, 1992; Deogratias et al., 1991

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access

being scrutinized more through government regulation. Disease resistance should include resistance to *Phytophthora* spp., *Pseudomonas* spp., and crown gall (*Agrobacterium* spp.). Uniformity, good anchorage, and precocity are essential. While the ideal rootstock for all conditions does not yet exist, the thorough evaluation of existing rootstocks is necessary to identify the most promising material and to better define the needs and opportunities of future rootstocks.

Literature cited

Alcañiz, E., J. Pinochet, C. Fernández, D. Esmenjaud, and A. Felipe. 1996. Evaluation of *Prunus* rootstocks for root-lesion nematode resistance. HortScience 31:1013–1016.

Ambrozic, T., B. Smole, and J. Siftar. 1992. Micropropagation of a plum ecotype (*Prunus domestica* L.) as rootstock for apricots. Acta Hort. 300:111–114.

Apoyan, E., E. Arklelian, and A. Steranian. 1985. Myrobalan seedlings as rootstocks for apricot varieties: Nursery study (from Rom, 1991).

Audergon, J.M., J. Duquesne, J.C. Nicolas, and A. Audubert. 1991. A new selected plum rootstock for apricot varieties: Torinel. Acta Hort. 293:395–400.

Bernhard, R. and J. Dunez. 1970. Le virus du chlorotic leaf spot, contamination de different espéces de Prunus. Population de virus. Ann. De phytop. VIII. Symp. Europ. Sur les maladies á virus des arbres fruitiéres. Bordeaux. 1970:317–335.

Bernhard, R. and J. Duquesne. 1988. Rootstocks selection for apricots in France. Acta Hort. 209:125–127.

Bojic, M. and S.A. Paunovic. 1988. The effect of inter-rootstocks on the content and seasonal changes of major elements, N, P, K, Ca in the leaves of apricot 'Hungarian Best'. Acta Hort. 209:131–141.

Chao, L. and D.W. Walker. 1966. Effects of temperature, chemicals, and seed coat on apricot and peach seed germination and seedling growth. Proc. Amer. Soc. Hort. Sci. 88:232–238.

Costa, G. and M. Grandi. 1975. The effect of various rootstocks on the behavior of the trees and on quality of apricot fruit. Univ. Bol., Italy. p. 55–62 (from Rom, 1991).

Crossa-Raynaud, P. and J. Audergon. 1987. Apricot rootstocks. In: Rootstocks for fruit crops, p. 295–320. Rom and Carlson (eds.). Wiley, New York.

Cupidi, A. 1992. In vitro micrografting of stone fruits. Petria. 2. Supplemento 1:7–15.

Deogratias, J.M., V. Castellani, and F. Dosba. 1991. Study of growth parameters on apricot shoot-tip grafting *in vitro*. Acta Hort. 293:363–368.

Duquesne, J. 1980. L'abricotier, INVUFLEC ed. J. Vidaud. CTIFL, p. 19–35.

Egea, L., T. Berenguaer, J.E. García, and L. Burgos. 1991. Influence of the rootstocks on development and production of Bulida and Perla cultivars of apricot. Acta Hort. 293:373–382.

Eremin, G.V. 1988. Genetics, breeding and selection of rootstocks for apricots. Acta Hort. 209:121–124.

Ermel, F.F., A.M. Catesson, and J.L. Poëssel. 1995. Early histological diagnosis of apricot/peach x almond grâft incompatibility: statistical analysis of data from 5-month-old grafts. Acta Hort. 384:497–504.

Forte, V. 1987. L'Albicocco. 3rd ed. Edagricole, Bologna.

Grassi, G., F. Monastra, and C. Fideghelli. 1978. Position of and prospect for apricot growing. Info. Agr. 1978:3729–3732 (English abstract excerpted from Rom, 1991).

Guerriero, R. and G. Scalabrelli. 1984. L'influence du portegreffe sur la dormanc de l'arbri cottier. Aur. Ital. 5/6:103–116 (from Rom, 1991).

Hassen, M.M. and P.B. Catlin. 1984. Screening of apricot seedlings for response to salinity. HortScience 19:243–245.

Hassan, M.M., A.A. Moustafa, M.A. Salama, and Z.A. Ibrahim. 1991. Influence of IBA application on rooting ability of apricot stem cuttings. I. Responses on rooting criteria and endogenous regulators. Egypt. J. Hort. 18:95–103.

Jakubowski, T. and H. Zdyb. 1995. Apricot breeding and research in Poland. Acta Hort. 384:251–254.

Lane, W.D. and F. Cossio. 1986. Adventitious shoots from cotyledons of immature cherry and apricot embryos. Can. J. Plant Sci. 66:953–959.

Lichou, J. and A. Audubert. 1989. L'abricotier. J. Granier, CTIFL, Paris, France.

Maidebura, V.I. and N.M. Kniga. 1986. Peach rootstock 'Chanturguc Montclar'. Propagation of top and small fruit crops by softwood cuttings in protected ground. Arbor. Fruit. Sadov. i Vinograd. Mold. 10:26–29.

Marino, G., E. Magnanini, S. Battistini, and B. Righetti. 1991. Effect of hormones and main carbo energy sources on in vitro propagation of apricot (*Prunus armeniaca* L.) Cvs. 'San Castrese' and 'Portici' apricot. Acta Hort. 293:355–362.

Mitrevski, Z. and B. Ristevski. 1991. Root system of apricot-tree depends from rootstock. Acta Hort. 293:405–408.

Monastra, F. and F.R. De Salvador. 1995. Apricot: Present and future. Acta Hort. 384:401–414.

Moreno, M.A., M.C. Tabuenca, and R. Cambra. 1995a. Adesoto 101, a plum rootstock for peaches and other stone fruit. HortScience 30:1314–1315.

Moreno, M.A., M.C. Tabuenca, and R. Cambra. 1995b. Ademir, a Myrobalan rootstock for plums. HortScience 30:1475–1476.

Nicotra, A. 1981. Rooting trials of hardwood cuttings of several apricot cultivars. Acta Hort. 85A:499–504.

Nitransky, S. 1978. Evaluation of peach and apricot cultivars in relation to unfavorable climatic conditions in the spring. Sempra 13–15 (English summary from Rom, 1991).

Nitransky, S. 1981. Effect of different rootstocks on some growth and fruiting characteristics of the apricot cultivar 'Ruz Ova Skora'. Ved. Prac. Vysk. Ust. 3:5–15 (English summary excerpted from Rom, 1991).

Nitransky, S. 1983. Effect of rootstock on termination of deep dormancy in the reproductive buds of apricot. Pol'nohospodarstvo 29:457–471 (English summary from Rom, 1991).

Ogasanovic, D., R.M. Plazinic, and V.M. Papic. 1991. Results from the study of some early apricot cultivars on various interstocks. Acta Hort. 293:383–389.

Ogasanovic, D. 1995. Apricot research and production in Yugoslavia. Acta Hort. 384:151–155.

Paunovic, S. 1977. Species, cultivars, rootstocks and environment. EPPO Bul. 7:11–28.

Paunovic, S. 1978. Twenty-five years of rootstock and interstock research relating to apricot decline. Cent. Nav. Idon. Info. Sof. 1:37–45 (from Rom, 1991).

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access

Renaud, R. 1993. Rootstock, production and improvement. Arb. Fruit. 460:19–21 (English summary from Agricola).

Rom, R.C. 1991. Apricot rootstocks: Perspective, utilization and outlook. Acta Hort. 293:345–353.

Rosati, A., T. De Jong, and S.M. Southwick. 1996. Comparison of leaf mineral content, carbon assimilation and stem water potential of two apricot (*Prunus armeniaca*) cultivars grafted on 'Citation' and 'Marianna 2624' rootstocks. In: B.H. Barritt and F. Kappel (eds.). Proc. 6th Intl. Symp. on Integrating Canopy, Rootstock, and Environmental Physiology on Orchard Systems. Acta Hort 451:263–267.

Salazar, D.M., M. Miro, and S. García. 1991. Rootstocks for dry region apricot tree faced with *Capnodis tenebrionis* L. Acta Hort. 293:401–404.

Sansavini, S. and P. Montevecchi. 1986. Comparison of new and old apricot rootstocks. Acta Hort. 192:407–416.

Smith, C.O. 1928. The Japanese apricot as a root-stock. Proc. Amer. Soc. Hort. Sci. 25:183–187.

Snir, I. 1984. *In vitro* propagation of 'Canino' apricot. HortScience 19:229–230.

Southwick, S.M. and J.T. Yeager. 1998. Effect of rootstock, cultivar and orchard system on apricot production. Acta Hort. (In press.)

Southwick, S.M., J.T. Yeager, K.G. Weis, W.H. Olson, R. Buchner, W. Krueger, and B. Kirkpatrick. 1997. Effects of budding height and timing on tree growth and incidence of bacterial canker in French prune in 1997. Calif. Prune Brd Annu. Rpt.

Stadler, J.D. and P.J.C. Stassen. 1986. An evaluation of rootstocks for apricots on sandy soils. S. Afr. J. Plant Soil 3:203–205.

Stassen , P.J.C. and N. Hurter. 1981. Rootstocks for apricots: A preliminary evaluation. Decid. Fr. Grow. 31:102–103.

Stassen, P.J.C. and J.D. Stadler. 1983. Effect of period and time of waterlogging on growth of Marianna and peach rootstock. Decid. Fr. Grow. 33:65–69.

Tabuenca, C.M. and J. Herrero. 1965. Incompatibilidad entre patron e injerto. Variedades de albaricoguero injertadus sobre Myrobalan B. An. Estac. Exp. Aula Dei. Zaragoza. 8:177–186.

Terblanche, J.H., I.S. De Kock, and J.A. Van Zyl. 1974. The influence of physical soil factors on the choice of rootstocks for apricots. Decid. Fr. Grow. 24:82–86.

Teviotdale, B.L., J.M. Ogawa, G. Nyland, and B.C. Kirkpatrick. 1989. Diseases. In: Peaches, plums, and nectarines. Growing and handling for fresh market. Coop. Ext. Univ. Calif. Publ. 3331:118–132.

Vachun, Z. 1995. Rootstocks for apricot—The current situation and main problems. Acta Hort. 384:459–465.

Downloaded from https://prime-pdf-watermark.prime-prod.pubfactory.com/ at 2025-08-31 via free access