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A Simple Method for Field Identification of Mahaleb (*Prunus mahaleb* L.) Cherry Rootstock

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Most sweet and sour (Amarelle) cherry cultivars have long been grafted onto *P. avium* L. (mazzard) or *P. mahaleb* L. (mahaleb) rootstocks (3, 4, 5). These plants differ greatly in their botanical characteristics (5, 10) and in their adaptability to environments and subsequent rootstock performance (3, 4, 5, 10). For example, mahaleb performs well in deep well-drained soils, but does not tolerate anaerobic conditions, while mazzard tolerates heavier soils better but is subject to drought stress in sandy-porous soils (2, 3, 4, 6). Mahaleb is more susceptible to root rots caused by *Phytophthora* and *Armillarea*, while mazzard is more susceptible to crown gall and to lesion nematodes (4, 7, 9). Scion cultivars infected with X-disease live longer on mahaleb and symptom expression differs according to the rootstock (4, 6). In the west, gophers show preference for mahaleb rooted trees over mazzard (4). In colder climates, mazzard roots are known to be more sensitive to low temperature than mahaleb (1, 2).

Identification of the rootstock can aid growers or extension agents in diagnosing causes of poor tree health and aid in treatment of the disorder or in prevention by replacing trees with the proper rootstock. To date, field agents with training have confirmed rootstock identification by foliage characteristics of rootstock suckers. However, suckering in mazzard occurs infrequently and rarely in mahleb and especially so in young orchards. Techniques, using root pieces, have been described by Tukey (9) and Upshall (10), and Nebel (8) which can aid in identifying the rootstock with or without the need of laboratory service. However, these methods are time consuming and they rely on subjective judgement. The ferric chloride test described by Nebel (8) was tried by this researcher and found to be inconsistent depending upon mahaleb strain and time of year. Day (4) in 1951 described a simple technique of submerging root bark shavings in a glass of water, whereupon the water with mazzard or morello tissue would progressively change from yellow within a few seconds, to dark-orange, several hours later. Mahaleb bark-pieces would not or only slightly change water color.

With slight modification, we have simplified this technique by collecting roots 2-5 mm x 2.5 cm; scraping the root bark with a sharp instrument such as a knife, followed by submerging the roots in water. While this technique appeared effective, it still required the comparison to a known identified sample which is not always possible in the field. Roots of different sizes, when submerged for various time periods, produced unreliable results.

To determine the best technique, equal numbers of roots were collected

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from each of 5 four-year-old mahaleb and mazzard seedling trees. Roots were scraped with a knife, cut into 20 mm lengths, rinsed with distilled water, separated into size groups of 2, 5 and 10 mm in diameter and stored at 200C in 200 ml water. Leachate was collected and absorbance measured after 0.25, 0.50, 1, 2, 5, and 24 hrs. at 440 nm on a Beckman Quartz Spectrophotometer, Model DUR.

The treatments that provided the greatest differentiation in leachate color, according to absorbance and visual appearance (Fig. 1), were those where mahaleb leachate was closest to 0 or transparent and mazzard leachate was high or orange in color (Table 1). The best treatment appeared to be when 2 mm diameter roots were submerged for 30 and 60 min as indicated by absorbance of mazzard leachate being over 9 times that of mahaleb leachate.

Leachate color and absorbance were greatest after 24 hrs., for both rootstocks. Leachate color of large mahaleb roots was orange after 24 hrs., making visual differentiation from mazzard leachate difficult. Variability in absorbance of leachate samples was likely related to nonuniform scraping or wounding of the periderm of root pieces.

In summary, a 30-60 min. submersion period of 2 mm diameter roots will yield definitive results in a fairly short amount of time without the need

Figure 1. Leachate samples of mazzard (upper) and mahaleb (lower) roots, 5 mm × 20 mm after 60 min. of submersion.

Table 1. Absorbance and ratio of absorbance at 440 nm of tissue leachate between mazzard and mahaleb roots[y] after submersion in water.

	2 mm Diam			5 mm Diam			10 mm Diam		
Leaching Time	Mazz	Mah	Mean[z] Ratio	Mazz	Mah	Mean Ratio	Mazz	Mah	Mean Ratio
0.25	.055	.024	4.0	.125	.067	2.3	.410	.086	5.1
0.5	.198	.027	9.1	.351	.090	4.7	.656	.126	6.2
1.0	.319	.044	9.6	.500	.144	4.9	.829	.215	4.6
2.0	.422	.059	7.7	.783	.122	4.7	1.023	.385	3.2
5.0	.690	.116	6.5	1.296*	.338*	4.0	2.086*	.599*	3.8
24.0	1.052	.113	10.2**	2.222*	.332*	7.1**	12.445*	.738*	22.0**

*Mean separation across rootstock by LSD 0.951 significant at .05 level.
**Mean separation across size by LSD 5.9 significant at .05 level.
[z]Absorbance of: mazzard/mahaleb.
[y]Leachate of 10 roots at 20 mm length.

for comparison to a standard known rootstock. A light rinsing of roots prior to water storage treatment is recommended in order to obtain clear leachate. This technique can only eliminate the existence or non-existence of mahaleb roots in the sample tested. The distinguishing of *P. avium* from other species cannot be made by using this technique.

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Book Review

Marjasordid Eestis (Small Fruit Cultivars in Estonia), 1985, by Johannes Parksepp. Department of Fruit Growing, Estonian Institute of Agriculture and Land Improvement, U.S.S.R., Valgus Publishers, Tallinn.

Written in the Estonian language, this 456-page text plus 42 color photographs is an up-to-date book of a high standard by a knowledgeable author of his over-30-year investigations. The book is particularly concerned with small fruit growing in Estonia. The Estonian S.S.R., slightly larger than Belgium, being southern neighboring territory of Finland, is situated on the north-western edge of the U.S.S.R.

The book is an alphabetical listing describing the small fruit cultivars introduced into Estonia from a few hundred years ago up to date, 1980. During this period, 1,100 different cultivars including 361 strawberry, 172 raspberry, 175 currant, and 392 gooseberry cultivars are introduced into this land only. Of course, many of them have perished or have been excluded by now and they have a historic relevance only.

Each of the major cultivars is described at its origin with the parents given, of known, coupled with brief descriptions of fruit characteristics, plant habitat and references to other sources of information. Information is given on productiveness, harvesting period, winter-hardiness, pest and disease resistance.

Two introductory chapters provide a great deal of valuable information. One chapter treats the history of introducing the cultivars beginning with the medieval centuries. A very great quantity of numbers are concentrated in the tables concerning yields, berry masses, chemical compositions, etc. The extensive list of references is compiled from reports by workers in fruit science in many countries.

This treatise is one of the most valuable books on small fruit cultivars of a specific region ever produced. The volume concludes with an easy-to-use index of cultivar names and its synonyms.

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