ADAPTABIL (*PRUNUS BESSEYI* X) – A CLONALLY ROMANIAN ROOTSTOCK WITH HIGH EFFICIENCY TO NURSERY PROPAGATION

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Abstract

Adaptabil rootstock was named in Romania, in the year 2 000, by Research Institute for Fruit Growing (RIFG) Pitesti (the owner), together with another rootstock, Miroper, both of them being the first Romania's for peach clonally rootstocks. Adaptabil rootstock is resistant to diseases, drought and waterlogging, has a medium to low vigor, and may be used on a large range of soils. It was named like a clonally rootstock for peach varieties (nectarine included) but, it is a polyvalent rootstock, proper to be used for European plum (Romanian Tuleu group and Reine Claude excluded) and for apricots (only non congenial varieties). The studies were carried out at RIFG in respect with propagation abilities during the end of July and mid of August period of time, involving two kind of cuttings, treated with two rooting promoters and planted on three rooting media. The best rooting media was sand (ready to find in Romania), followed by a mixture 1:1 sand and turf. The best kind of cuttings proved to be those made from the next segment after the top of the shoots (we call them base cuttings). Rooting percentage of the base cuttings was between 97.5 (test, untreated), up to 100 (RV1 stimulus). The base rooted cuttings are fit to be planted in nursery for summer budding, but are not the same situation with the cuttings made from the top of the shoots where 50% out of them need to be stacked in nursery at small distances for another year. That is the reason for which we are thinking for another propagation technology intended to use only 10-15 cm length top cuttings, instead of 30 cm, and much longer base cuttings (40-45 cm).

Key words: **rootstock, softwood cuttings, propagation**

1.Introduction

In the year 1978, the first two Romanian vegetative rootstocks were named at Fruit Research Station Geoagiu (Corcodus 163 – a myrabalan rootstock, and G 21 an apple for rootstock). During the 1978-2006 period 24 vegetative (clonally propagated) rootstocks were named (Braniste & Dutu, 1997), but except C 12 cherry rootstock, their commercially propagation was non–existent. They were generally used in experimental plots.
Research Institute for Fruit Growing (RIFG) Pitesti named its own first vegetative rootstock in year 1984 (IP-C1, for cherries). In 2006, the total number of vegetative rootstocks named during the 1984-2006 period was 9. In this respect, RIFG is the leader in Romania, followed by the Research Station for Fruit Growing (RSFG) Valcea, with 6 rootstocks.
Adaptabil rootstock is the result of an individual positive selection from a *Prunus besseyi* Bailey open pollinated seedling made at RIFG Pitesti (Dutu, 2002) in the year 1983 (code study B 83/1). It was named in the 2000 year like a for peach rootstock, together with another rootstock (Miroper). They are the first two Romanian vegetative rootstocks for peach (Indreias, 2004). This rootsock is a polyvalent one, good both for European plum (Romanian Tuleu group and Reine Claude excluded), and for apricot (only non congenital varieties). It is under test now for cherries varieties.
The year 2007 should to be considered like the start year for commercial propagation (over 16,000 rooted plants were obtained at RIFG).
The results to vegetative propagation by softwood cuttings were similar in experimental plots versus commercially propagation, so this rootstock may be considered like a reliable one for nurserymen (Dutu, 2004).
In the mother plantation (2,500 plants / ha), beginning with the 3rd leaf, about 75,000 shoots / ha can be collected. Each shoot gives two softwood cuttings, so finally at least 135,000-140,000 rooted plants (the number increase the next years, with plant canopy development) will be obtained.
Adaptabil mother plantation needs a very limited chemical sprayings (2-3) because the foliage is very resistant to diseases.

The rootstock itself is resistant both to drought and water logging, has a medium to low vigor and is possible to be used in the future for high density orchards.
The objective of this paper is to present the results obtained by the softwood cuttings propagation method.

2.Material and method

Experiments were conducted to find out the best media for rooting, the most effective way of using shoots for cuttings, and if it is or not necessary to use artificial rooting promoters for this rootstock.
We used three rooting media: a) washed sand used on construction sites to prepare concrete; b) 1:1 mixture of washed sand and peat; c) 1:1 mixture of peat and perlite (re-utilized).
From each shoot, two cuttings were made: a) a top cutting, 30 cm in length; b) a base cutting 25 cm in length.
Rooting promoter treatments: a) untreated (test); b) Radistim V1, a Romanian commercial trade powder product recommended for herbaceous cuttings; c) Radistim V2, recommended for half – lignified and for hardwood cuttings.
Planting density was 250 cuttings / m^2 (8 cm apart the rows, and 5 cm between the cutting in the row). Time for planting was end of July – beginning of August. Every variant had 200 cuttings (four replications x 50 cuttings).
Rooted plants were harvested at the end of October. Measurements were made in respect with the number of rooted plants, the length of rooted portion and the number of principal roots.
Results were evaluated by Duncan's multiple range test.

3.Results

The best rooting media was sand with 94.6 % rooted plants, followed by sand and peat mixture with 90.1 % (Figure 1). No significant differences between them were noted. On the other hand, the rooting percentage on the peat and perlite mixture was only 78.2%. We consider that the weaker results on this media are due to its utilization in the previous year to root blueberry cuttings. This aspect confirms the fact that it is imperiously necessary to change the rooting media before every new propagation cycle.

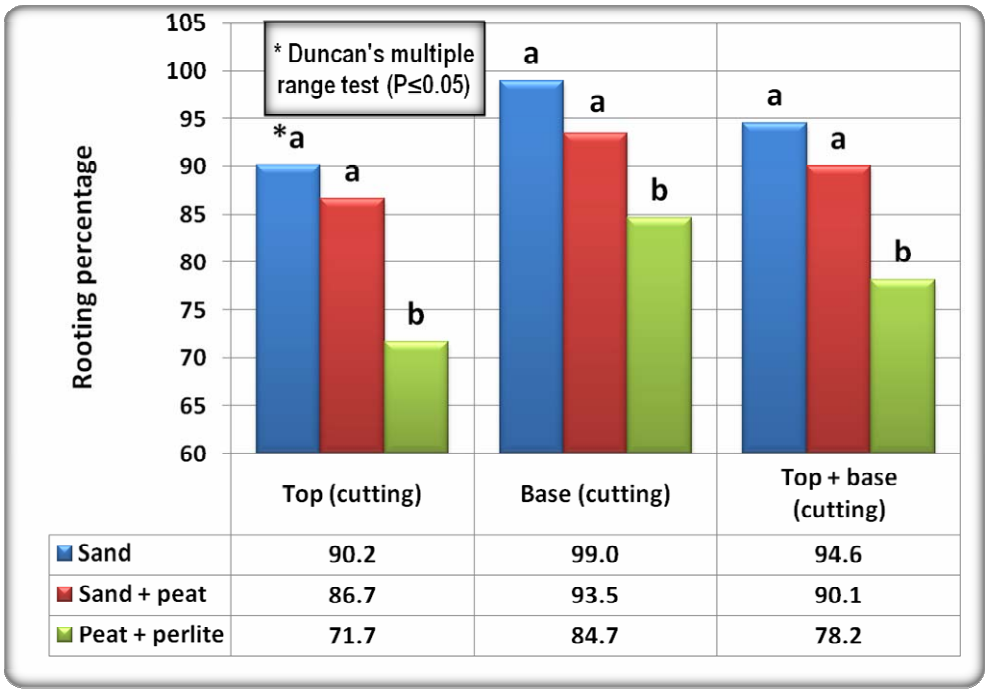

Figure 1. Rooting percentage of the media used
(no significantly differences between the columns with the same letter).

The fact that sand gave the best results was encouraging for Romanian nurserymen because it was easy to find and cheaper than peat and perlite (Figure 2). The only disadvantage is linked with its high cubic meter weight (about 2 400 kg).

Figure 2. Adaptabil rooted cuttings

The best cutting type was the base cutting. Base cuttings rooted 92.4 % compared with top cuttings which rooted only 82.3 % (Figure 3). An additional aspect is the fact that almost 30-40 % out of the total rooted top cuttings need to be stacked at small distances for another year, after that period it is able for planting in the fruit-tree nursery.

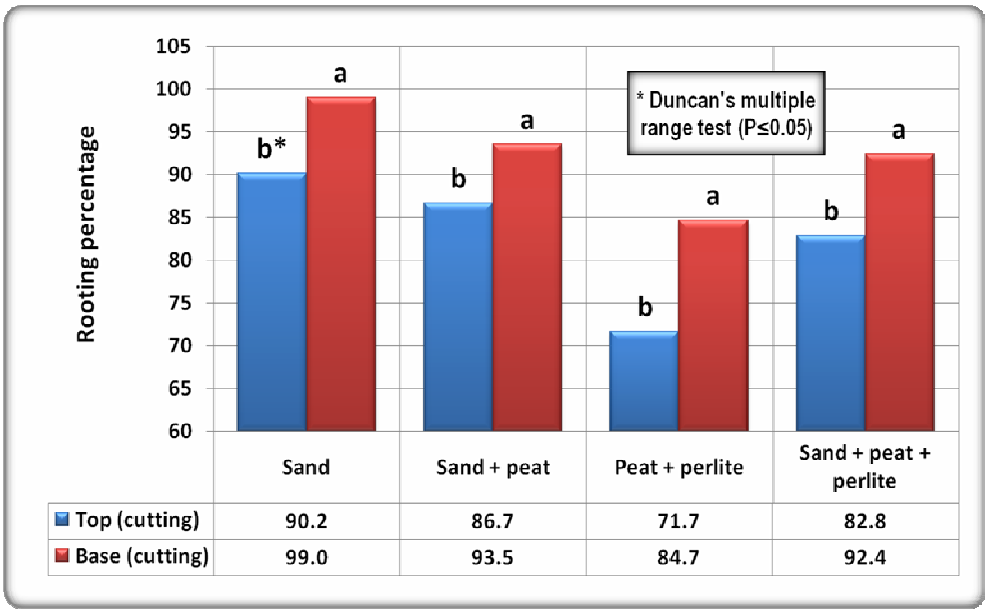

Figure 3. Comparison of the cutting type used

The best rooting promoter was Radistim V1 (93.9 % rooted plants). The second was Radistim V2, with 89.6 %, but with no significant differences between them (Figure 4). Untreated cuttings (test) rooted only 79.3 %. So, even for Adaptabil rootstock using rooting promoters is necessary to achieve better results.

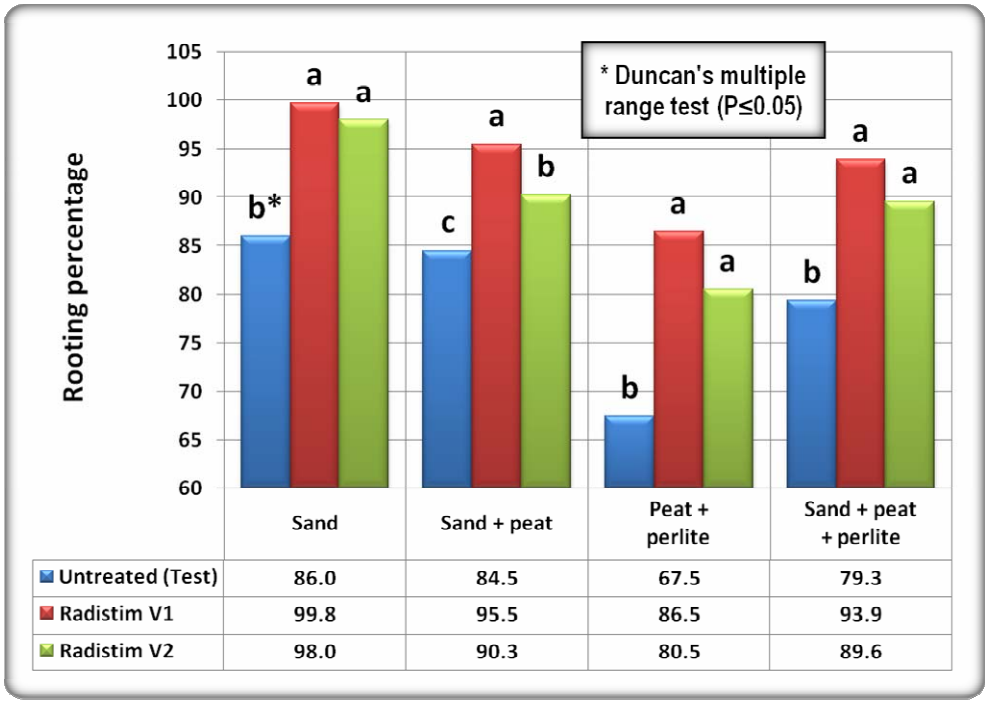

Figure 4. Comparison of the rooting promoter treatments used

Rooting promoters influenced the length of the rooted zone. The best results were achieved with Radistim V2, where adventives roots came out on a 2.54 cm zone up from the bottom, followed by the Radistim V1 with 1.98 cm (Figure 5), but no significant differences occurred between them.

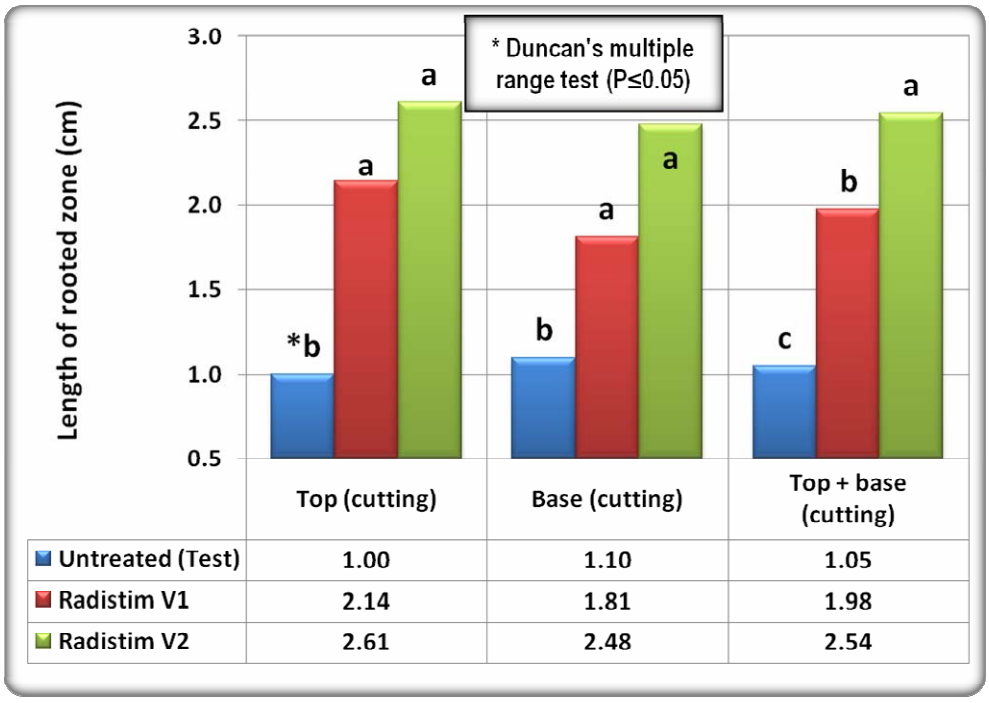

Figure 5. Comparison of the length of the rooted zone

Untreated cuttings practically rooted only at the bottom (1.05 cm). Consequently, the number of main roots was bigger for the cuttings treated with rooting promoters (Figure 6).

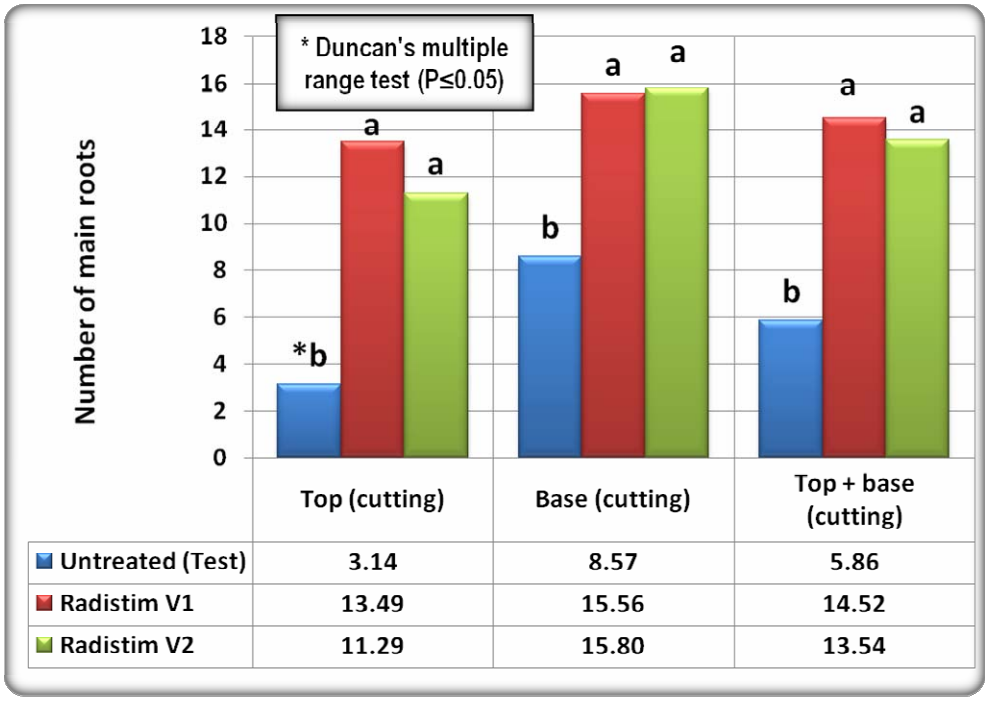

Figure 6. Comparison of the number of main roots

The higher value was obtained with Radistim V1 (14.52 pieces / rooted plant), closely followed by Radistim V2 (13.54 pieces / rooted plant), but again with no significant differences between them. The untreated with stimulus rooted plants (test) had only 5.86 roots per plant. Even the average length of principal roots was very close between all variants, the higher number of roots the higher quality of the rooted plants.

4.Conclusions

Sand proved to be a reliable rooting media for Adaptabil softwood cuttings, having a good drainage, and being cheaper than peat and perlite.
Even if the media utilized in the previous propagation process were disinfected before a new re-utilization, it was not a good propagation practice.
The best way to propagate the Adaptabil rootstock by softwood cuttings is to make shorter top cuttings (about 20 cm length), and longer base cuttings (about 35-40 cm). The next season the rooted top cuttings will be stacked at small distances before being able for planting in the fruit-tree nursery.
Using rooting hormones was benefic for Adaptabil, on the whole, even if the base untreated cuttings planted on sand gave 97.5 % rooted plants.

References

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