IMPROVED FEATHERING BY COMBINED APPLICATION OF BENZYLADENIN (BA) AND BIOSTIMULATORS

L. Magyar, Z. Barancsi, K. Hrotkó
Corvinus University of Budapest, Hungary, Department of Fruit Science

Abstract

Fruit growers prefer well feathered trees for planting intensive orchards. Besides nurseryman's practices (pinching shoot tips or young leaves) plant bioregulators proved to be efficient in secondary shoot formation. Among them, benzyladenin (BA) is the most frequently used compound for lifting the dormancy of summer buds. Based on our trials secondary shoot formation and shoot growth can be achieved by BA and GA application on apple, cherry and plum nursery trees. However, the treatments are efficient, the result, e.g. growth of secondary shoot is variable year by year, which seemed to be in interaction with weather conditions and root potential of trees. In agriculture some biostimulators are used to improve root growth and due to this, the crop. Our intention was to test these biostimulators in combined application with BA. In order to improve the feathering of apple nursery trees in 2007 a trial was carried out on one-year-old 'Idared' on M.9 and MM.106 trees. Besides the usual BA application, three times Kelpak and Wuxal Ascofol were carried out on the growing scion shoot from May in two weeks intervals. In autumn before lifting the tree height, caliper, length of secondary shoots was measured and number of feathers was counted. Biostimulator Kelpak and the leaf fertilizer combined with biostimulator Wuxal Ascofol applied alone did not affect the shoot growth, albeit Kelpak improved the root quality and branching. Both biostimulators applied in combination with BA increased the number of feathers and the length of feathers (secondary shoots). Based on our results, the highest number and length of secondary shoots could be achieved by combined application of BA and Kelpak. To improve the results, further trials are needed to find optimal concentration and term of treatments.

Key-words: **M.9, MM.106 rootstocks**

1.Introduction

Fruit growers prefer well feathered trees for planting intensive orchards. Besides nurseryman's practices (pinching shoot tips or young leaves) plant bioregulators proved to be efficient in secondary shoot formation. Among them benzyladenin (BA) is the most frequently used compound for lifting the dormancy of summer buds (Jacyna et al., 1989; Jaumien et al., 1993; Hrotkó et al., 1996; 2000; Magyar and Hrotkó, 2002; 2005). Based on our trials, secondary shoot formation and shoot growth can be achieved by BA and GA application on apple, cherry and plum nursery trees (Hrotkó et al. 1996, 2000, Magyar and Hrotkó 2002, 2005).
However, the treatments are efficient, the result, e.g. growth of secondary shoot is variable by a year–to–year basis, which seemed to be in interaction with weather conditions and the tree root potential. In agriculture, some biostimulators are used to improve root growth and due to this, to increase the crop. By our experience, the root growth capacity might be an important factor in this development. Biostimulators (Kelpak ®, Wuxal® Ascofol) as stimulators of root growth may positively influence the effect of BA application. Our intention was to test these biostimulators in a combined application with BA aiming at improving tree branching and quality of nursery trees.
Biostimulator and the leaf fertilizer Kelpak combined with the Wuxal Ascofol biostimulator applied alone did not affect the shoot growth, albeit Kelpak improved the root quality and branching. Both biostimulators applied in combination with BA increased the number of feathers and the length of feathers (secondary shoots). Based on our results, the highest number and length of secondary shoots could be achieved by combined application of BA and Kelpak. To improve the results, further trials are needed to find optimal concentration and term of treatments.

2.Materials and methods

In order to improve feathering and quality of apple nursery trees, a trial was carried out in 2007 on one-year-old 'Idared' grafted on M.9 and MM.106 trees. Besides the usual BA application, three times Kelpak and Wuxal Ascofol was carried out on the growing scion shoot from June in two weeks intervals. In autumn before lifting the tree, the height, diameter and the length of secondary shoots was measured and the number of feathers was counted.
Plant material was consisted of: apple, one-year-old nursery trees of Idared/M.9, Idared /MM.106. Biostimulators and bioregulators were sprayed three times onto the leaf surface on June 2007 at 10 days intervals. Ten trees were treated in one plot, five times repeated in randomized blocks.
Treatments: No. 1, Untreated control; No. 2, using Kelpak ® 0,2%; No.3, with Wuxal® Ascofol 0,2%; No. 4, with BA 0,02%; No. 5, with Kelpak® 0,2% + BA 0,02%; No. 6, with Wuxal® Ascofol 0,2% + BA 0,02%.
Before lifting the trees in October, the following data were measured: tree height and trunk diameter at 30 cm height above budding, number of sylleptic shoots, length of sylleptic shoots. Root density was estimated by rating from 1-5. Data were tabulated and statistically analysed using Duncan's multiple range test.

3.Results and discussions

Fig 1 shows the number of secondary shoots formed on the one-year-old tree. Blue column shows the number of laterals formed underneath to the trunk height and therefore removed from the tree. Biostimulators alone did not affect the secondary shoot formation. The application of benzyladenin (BA) as usual (Hrotkó et al. 1996, 2000, Magyar and Hrotkó 2002, 2005) significantly increased the secondary shoot number. Compared to BA treatment the combined Kelpak® + BA treatment was the most efficient in increasing the shoot number, followed by Wuxal ® Ascofol combination, both with statistically proven differences.

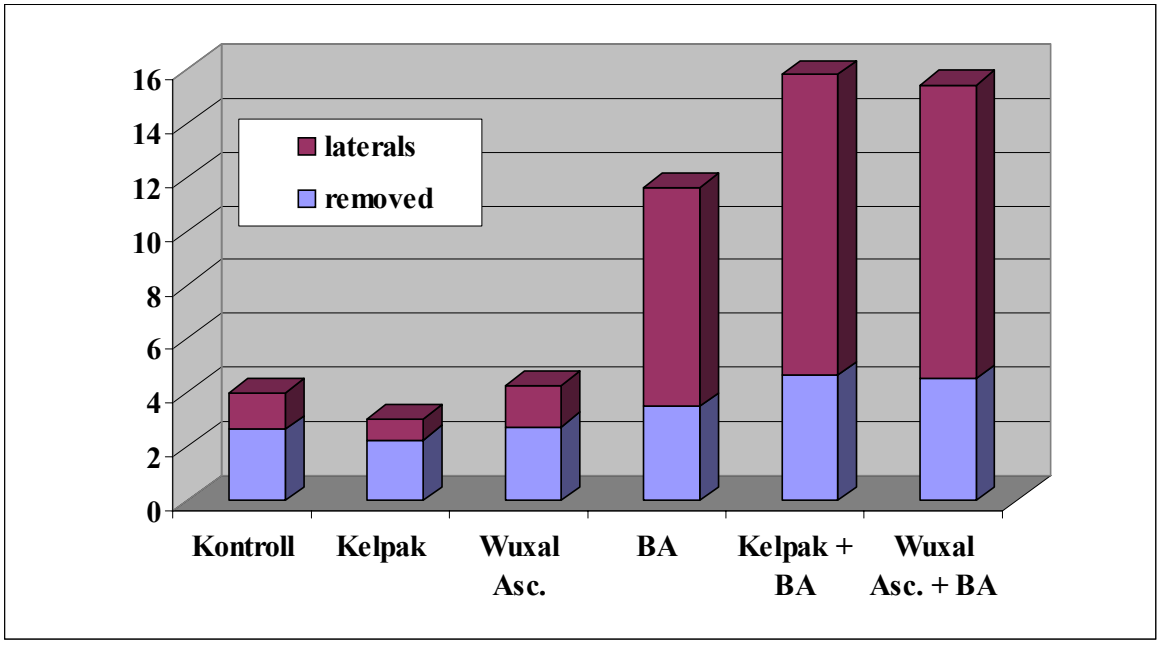

Fig 1. Effect of the treatments on the number of secondary shoots of one-year-old 'Idared' apple trees budded on MM 106

The total shoot length and the different length groups were also affected by treatments (Fig 2). Consistent with literature data (Jacyna et al. 1989, Jaumien et al. 1993,Hrotkó et al. 1996, 2000, Magyar and Hrotkó 2002, 2005) BA application significantly increased the length of laterals . The largest length of laterals was achieved with BA + Kelpak® combined application. The BA treatment combined with Wuxal® Ascofol resulted as an intermediate shoot length increase in each length group. The largest shoot length was produced by BA+Kelpak® combination in the valuable group > 20 cm.

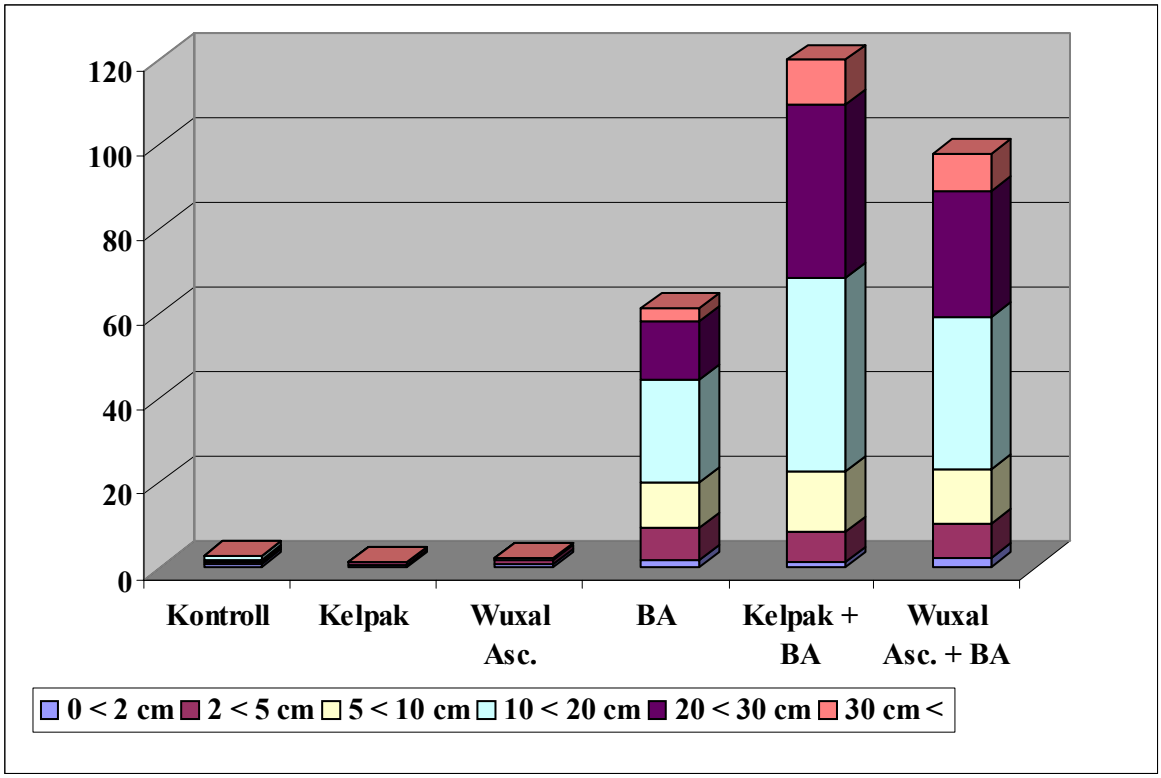

Fig 2. Effect of the treatments on the length (cm) of secondary shoots in the different length groups of one-year-old 'Idared' apple trees budded on MM 106

Further important traits for the tree quality were also affected by the treatments (Fig 3). There was no significant effect in tree height, but both Kelpak® and Wuxal® Ascofol increased the tree caliper (diameter) alone and as well in BA combination. Similarly, a significant increase was measured in root number and in root branching (density), the largest root number and branching were produced within Kelpak® treatments, but the Wuxal® Ascofol produced similar results.

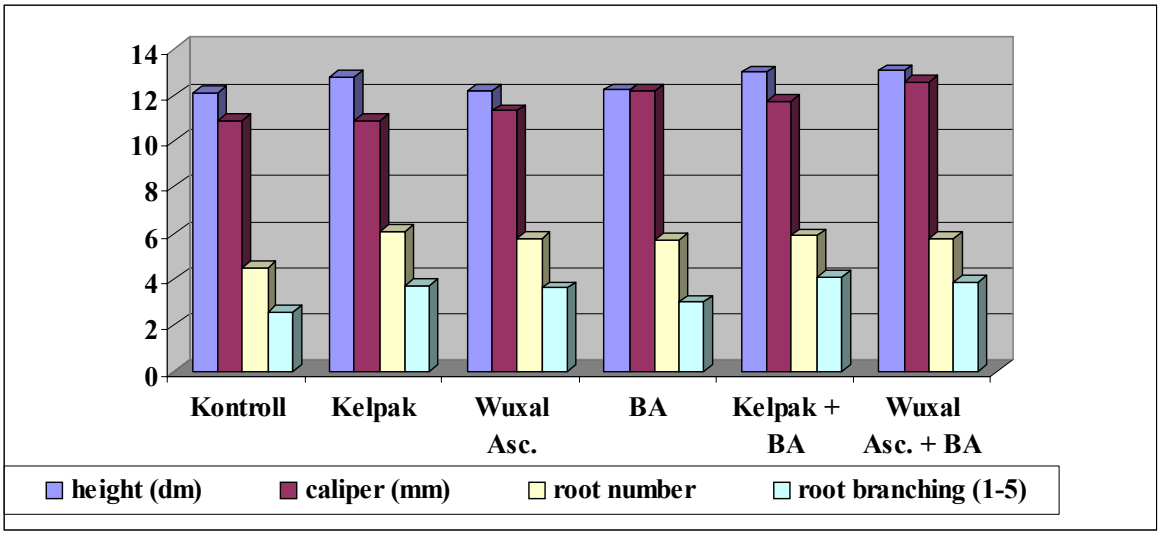

Fig 3 – Effect of the treatments studied on the tree quality traits on MM 106 rootstock

4.Conclusions

Biostimulators (Kelpak® , Wuxal® Ascofol) + BA treatments positively increased the number of laterals on one-year-old apple trees, especially in the length group longer than 20 cm, which is a valuable shoot quality. Biostimulators alone did not affect the lateral shoot formation.
Biostimulators (Kelpak®, Wuxal® Ascofol) alone applied and in combination with BA significantly increased the root number, as well as the branching of roots (density of fibrous root system), which is an important advantage in nursery tree quality.
Application of biostimulators (Kelpak®, Wuxal® Ascofol) alone can be useful to improve the root quality of nursery trees. Combined with BA treatment, it is efficient to improve tree feathering and secondary shoot quality.
Further trials are needed to find the optimal time for treatments and the optimal concentration.

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