Potassium nitrate outperformed other dormancy breaking agents in increase of flowering and fruit weight of strawberry

The aim of this study was to assess the effect of different rest breaking agents on alleviation of negative effects of unfulfilled chilling requirements on vegetative and generative growth of strawberry cv. ‘Merak’ in subtropic conditions. Foliar applications of four different dormancy breaking chemicals, each at two dose rates, were compared: potassium nitrate at 1,5 and 3,0%, dormex (H_2HCN) at 0,5 and 1%, gibberellic acid (GA_3) at 50 and 100 mg/L, volk oil at 2,5 and 5,0% and a control (spray with distilled water). Induced but dormant young rooted daughter plants were potted in 3L plastic pots filled with 2:1 sandy loam soil:compost and fertigated with Hoagland solution. After 2 weeks of establishment (in the beginning of November) the treatments were foliar applied. The plants were grown for 3,5 months in outside conditions at the Agriculture and Natural Resource College of Darab city in the Fars province of Iran, till and during harvest. The experiment was laid out in a randomized complete block design with 8 replications.

Number of flowers and number of inflorescences (clusters of flowers) of plants treated with the both doses KNO_3 in the foliar spray increased significantly compared to the other treatments (Table 1). Additionally, also the average fruit weight of primary and secondary fruits of a fruit cluster were increased when 3% KNO_3 was foliar applied (Table 1), and this was reflected in the highest number of achenes counted on these fruits. Achenes are the true fruits (“nuts”) of strawberry, and fertililized achenes will stimulate fruit growth after pollination. Berry weight is highly correlated with achene spacing and achene number. Observations on vegetative growth indicated that foliar

application with KNO_3also led to the highest augmentation of leaf area and increased root length compared to the control. All rest breaking agents showed effect compared to the untreated control, but only the foliar applied potassium nitrate applications resulted in the maximal effect on both plant growth and fruit weight of strawberry.

Table 1. The effect of rest breaking agents on number of flowers, number of inflorescences and weight of primary and secondary fruits in strawberry cv. 'Merak' plants. Means followed by the same letter are not significantly different at 5% probability using Duncan's t-test.

Treatment	Number of flowers	Number of inflorescences	Av. Fruit weight primary fruit (g)	Av. Fruit weight secondary fruit (g)
Control (water spray)	6,0 b	3,4 bc	13,7 b	13,4 b
KNO_3 1,5%	8,4 b	4,7 a	14,6 b	14,3 ab
KNO_3 3%	11,9 a	3,5 a	16,7 a	14,9 a
Dormex 0,5%	7,8 b	2,8 bc	13,5 b	13,3 ab
Dormex 1%	8,2 b	3,6 b	13,0 b	13,8 ab
GA_3 50 mg/l	3,2 c	2,5 c	13,0 b	12,6 ab
GA_3 50 mg/l	3,0 c	1,8 d	12,3 b	12,3 c
Volk oil 2,5%	5,2 bc	2,7 c	13,9 b	13,1 b
Volk oil 2,5%	5,4 bc	3,7 b	14,1 b	13,4 b