



Influence of Calcium-Metalosate on Conference

Introduction and aim

Nowadays besides to nitrogen and potassium also more attention is paid to calcium fertilization on pear. Several foliar calcium fertilizers are being advised. In this trial the influence of Calcium-Metalosate on mineral composition and on fruit quality is examined.

Experimental design

The trees are in their 13th growth year and the rootstock is Quince Adams. The planting distance is 3.50 x 1.50 m or 1.714 trees per ha.

In spring a standard fertilization was applied of 30 units of nitrogen (NPK-fertilizer, 12-12-17) and 50 units of K₂O (potassium sulphate, 50 % K₂O). On June 1st 50 units of MgO were applied (magnesium sulphate, 26 % MgO). On July 6th 150 kg/ha potassium nitrate (13 % N; 45 % K₂O) was applied.

The trees received a classical scheme of foliar fertilizers. In summer the following objects were added :

Object	Treatment	Dose	Date	% Ca
1	Control	-	-	-
2	Calcium nitrate	3 x 5 kg/ha	09/07, 26/07, 03/08	26 %
3	Ca-Metalosate	4 x 3 l/ha	09/07, 26/07, 03/08, 13/08	6 %

Results

Yield data 2007

This trials was harvested on September 3rd.

Table 1 : Yield 2007

Object	Kg/tree	Number of pears	Fruit weight (g)
Control	26.5	126	209
Calcium nitrate	29.6	137	217
Ca-Metalosate	30.1	137	222

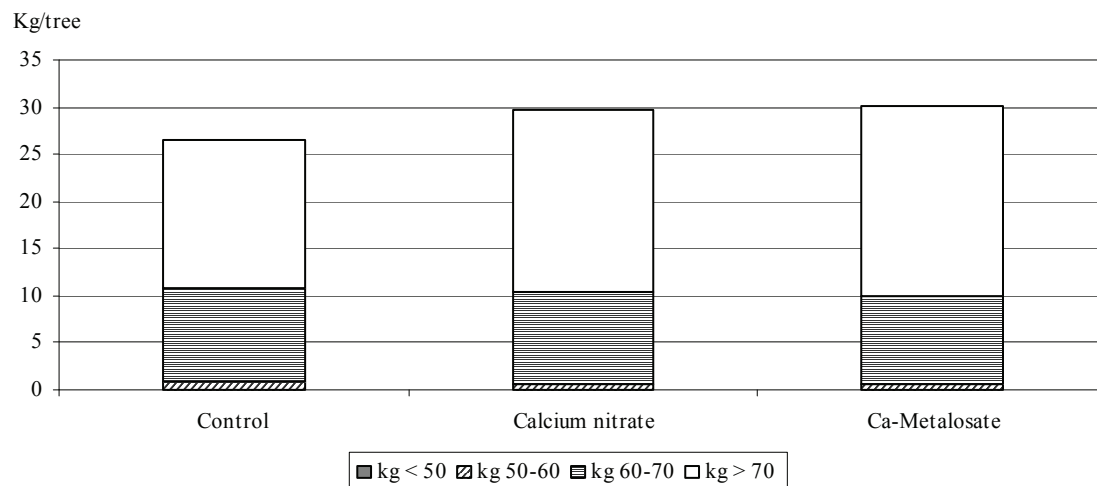


Figure 1 : Fruit size 2007

Leaf and fruit analyses

Leaf analyses

In September from each object a leaf sample was taken to determine the mineral composition. Before analysis the leafs were measured with a Hydro-N-meter, a device to determine the chlorophyll content of the leaves. This value is a measure for the nitrogen content in the leaves.

Table 2 : Hydro-N-values of the leaves

Object	Hydro-N-meter September 11 th
Control	639
Calcium nitrate	618
Ca-Metalosate	633

Table 3 : Leaf analyses in September

Object	% dry matter					Ppm	
	N	P	K	Mg	Ca	Mn	Fe
Control	1.95	0.13	0.73	0.40	2.61	127	73
Calcium nitrate	2.02	0.16	0.98	0.33	2.30	130	71
Ca-Metalosate	1.88	0.13	0.84	0.32	2.07	107	62
Optimal range	2.0-2.5	>0.14	0.9-1.5	0.23-0.25	1.5-2.5	60-300	40-200

On the basis of correlation calculations we want to investigate if there is a link between the Hydro-N-value and a number of elements in the leaf.

Table 4 : Correlation of the leaf analysis

	N	P	K	Mg	Ca	Mn	Hydro
N	1						
P	0.09	1					
K	0.37	0.48	1				
Mg	-0.08	0.24	-0.60	1			
Ca	0.02	0.54	-0.28	0.93	1		
Mn	0.86	-0.14	-0.12	0.15	0.07	1	
Hydro	-0.35	-0.42	-0.03	0.02	-0.01	-0.50	1

Both the control and the Ca-Metalosate object had a nitrogen content in the leaves that was just below the optimal value. Treatment with calcium nitrate did give an increase of the nitrogen content.

The calcium content in the leaves of the control was already high. The calcium treatments didn't result in an increase.

Concerning the correlation between the different elements, especially the correlation between the magnesium and the calcium content was strong.

Fruit analyses

At harvest from each object a sample was taken to determine the mineral composition. In this way we want to see to what extent the different foliar calcium fertilizers influence the composition of the fruits at harvest.

Table 5 : Fruit analyses

Object	mg/100 g fresh weight					
	N	P	K	Ca	Mg	Mn
Control	48.1	13.3	124	5.91	6.2	0.06
Calcium nitrate	41.8	12.4	109	6.21	5.7	0.05
Ca-Metalosate	47.9	14.4	122	5.47	6.0	0.06
Optimal range	65-80	> 10	120-160	6-10	6-10	0.09-0.15

In all objects the nitrogen content in the fruits was too low. The positive effect of calcium nitrate that was established in the leaves, couldn't be observed in the fruits.

Regarding the calcium content, calcium nitrate had a minor positive effect. Ca-Metalosate didn't cause an increase of the calcium content.

Fruit quality at harvest

At harvest fruit quality was determined on the basis of firmness, sugar content and starch value. These parameters give an idea of the ripeness.

Table 6 : Fruit quality at harvest

Object	Firmness (kg/0.5 cm ²)	Sugar content (° brix)	Starch value (1-10)	Streifindex
Control	5.8	13.5	7.3	0.06
Calcium nitrate	5.5	13.1	7.5	0.06
Ca-Metalosate	5.8	13.1	8.1	0.06

After shelf life

From each object a sample was put in shelf life (18°C) during 10 days. After 7 and after 10 days the background colour of the fruits was determined.

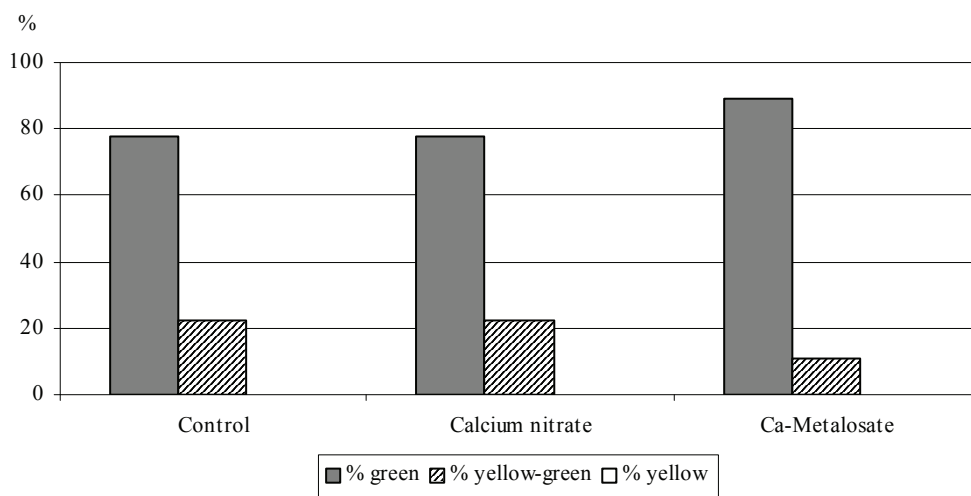


Figure 2 : Background colour after 7 days of shelf life

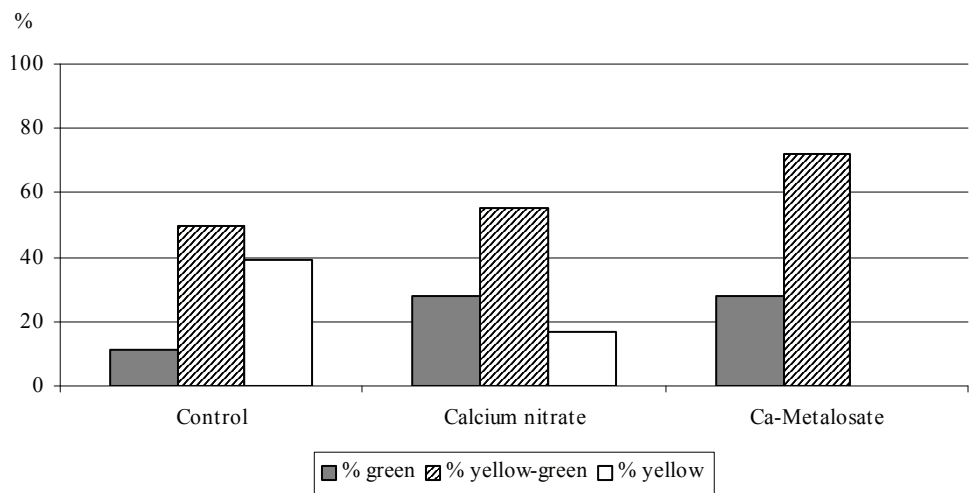


Figure 3 : Background colour after 10 days of shelf life

After shelf life, calcium nitrate and Ca-Metalosate treatment gave the highest percentage of green fruits. Especially the result of Ca-Metalosate was surprising. Even though this object had the lowest calcium content, it eventually didn't give any yellow fruits.

Fruit quality after storage

From each object a sample was stored in ULO until the beginning of February. Afterwards background colour as well as firmness and sugar content were determined. Then the fruits were kept at room temperature for 10 days. After 6 and 10 days, the background colour was determined again.

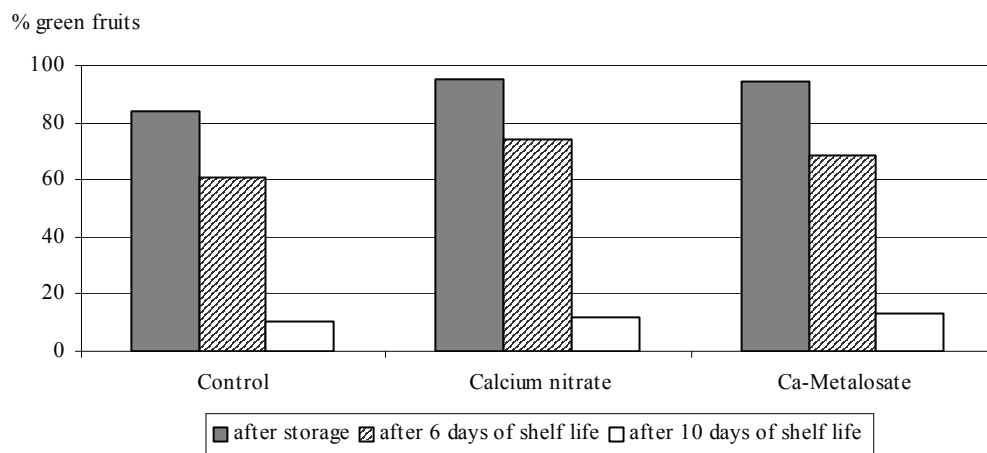


Figure 4 : Percentage of green fruits after storage

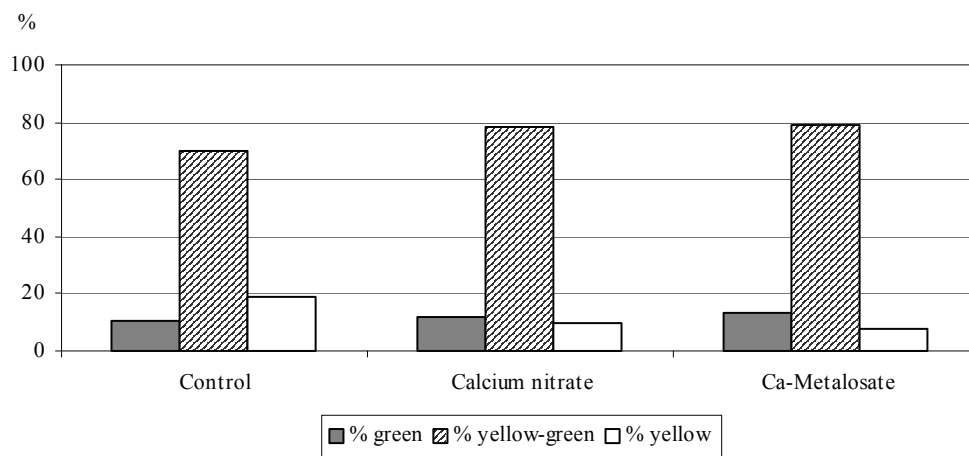


Figure 5 : Background colour after 10 days of shelf life

Table 7 : Fruit quality after storage

Object	Firmness (kg/0.5 cm ²)	Sugar content (° brix)
Control	4.5	13.4
Calcium nitrate	4.5	13.0
Ca-Metalosate	4.5	12.8

After storage all treated objects had more green pears compared to the control. Nevertheless there was no difference in firmness after storage. After 10 days of shelf life the amount of yellow fruits was about 10 % higher in the control than in the objects treated with calcium nitrate or Ca-Metalosate.

Discussion

The treatments with calcium nitrate only had a minor influence on the calcium content of the fruits. Probably the lower firmness at harvest was mainly due to the bigger fruit size and the higher number of pears. Nevertheless this object had the highest percentage of green fruits after 10 days of shelf life.

Ca-Metalosate didn't have any influence on the calcium content in the fruits. Nevertheless this object showed the best result after 10 days of shelf life. There were no yellow fruits and still almost 30 % of green fruits.

Conclusion

Treatments with Ca-Metalosate didn't increase the calcium content in the leaves or in the fruits. Nevertheless Ca-Metalosate had a slightly positive effect on the background colour. The firmness was not influenced.