

Control of aphids (*Aphis fabae* and *Myzus persicae*) on organic artichokes (*Cynara scolymus* L.)



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Background

On organic artichokes grown as annual crops in Central European climates large numbers of aphids (*Aphis fabae* and *Myzus persicae*) may cause severe damages to plant leaves and edible parts. We tested the effect of cultivar choice and three different organic pesticides on leaf aphid infestation and bud yield in two field trials.



Cultivars under study



'JW 109'
(= 'A 109')



'Imperial Star'



'Green Globe'



'Concerto'

Field trial design

Site: 'Wiesengut' experimental station (Hennef/Sieg, Germany)
MAT: 10,3 °C
annual precipitation: 840 mm
soil type: loamy sand

Trial A: 4 cultivars tested
no organic pesticides applied
Trial B: 3 org. pesticides tested
cultivar: 'Imperial Star'

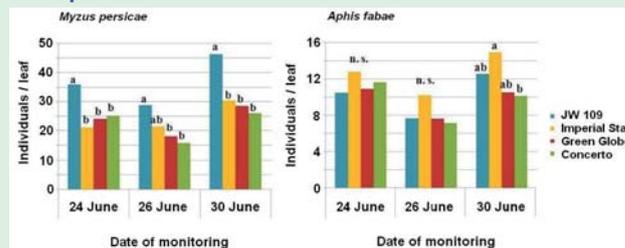
Seeding (greenhouse):
26 FEB 2009 (Trial A), 20 MAR 2009 (Trial B)
Transplanting to field:
17 APR 2009 (Trial A), 27 APR 2009 (Trial B)

Planting density: 0,8 x 1,2 m
Fertilization: 30 t ha⁻¹ farmyard manure
Weed control: Hand-hoeing
Harvest period: 2 JUL – 30 AUG 2009
Water supply: Drip irrigation
Field replications: 4

Cultivar effects (Trial A)

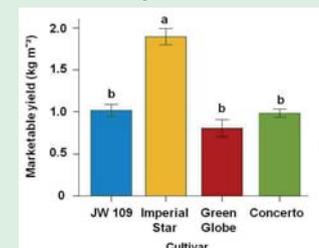
Naturally occurring aphid infestation was generally low (less than 10 individuals/leaf before 16 June 2009; data not shown). On 30 Jun 2009 highest total aphid population densities were recorded in 'JW 109' (61.3 individuals/leaf), lowest population densities were found in 'Concerto' (36.5 individuals/leaf). We recorded marketable bud yields between 1.89 kg m⁻² ('Imperial Star') and 0.80 kg m⁻² ('Green Globe'). No correlation between leaf aphid infestation and yield was detected.

Leaf aphid infestation



Treatments with the same letters are not significantly different (ANOVA with Tukey test, p<0.05). n.s.: not significant.

Marketable yield



Treatments with the same letters are not significantly different (ANOVA with Tukey test, p<0.05). Error bars represent standard errors.

Effects of organic pesticides (Trial B)

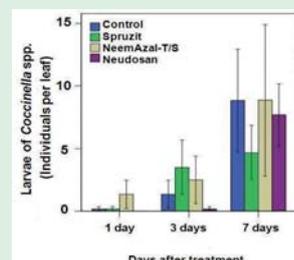
We compared the effects of three different organic pesticides versus a control on population densities of aphids and their predators on cultivar 'Imperial Star'. The pesticides investigated were *Spruzit* (4.59 g/l pyrethrins and 825.3 g/l rapeseed oil), *NeemAzal-T/S* (based on extracts from *Azadirachta indica*) and *Neudosan* (515 g/l green soap). Population densities of aphids were reduced after use of all three pesticides, their predators (*Coccinella septempunctata* and *Chrysoperla carnea*) were affected only by *Spruzit*. Bud yields were not affected by *Spruzit* but significantly reduced by *NeemAzal-T/S* and *Neudosan*, probably due to pesticide damages on artichoke buds and leaves.

Leaf aphid infestation

Days after application	<i>Myzus persicae</i>			<i>Aphis fabae</i>		
	1 day	3 days	7 days	1 day	3 days	7 days
control	100%	100%	100%	100%	100%	100%
Spruzit	37a	36a	42a	14a	16a	25a
	43%	58%	69%	10ab	12b	11b
NeemAzal T/S	81%	86%	81%	93%	63%	60%
	30ab	31ab	34ab	13ab	10b	15b
Neudosan	68%	78%	102%	64%	50%	40%
	25b	28bc	43a	9b	8b	10b

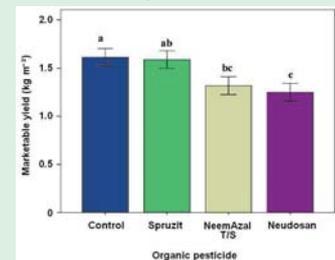
Treatments with the same letters are not significantly different (ANOVA with Tukey test, p<0.05).

Predator abundance



Error bars represent standard errors.

Marketable yield



Treatments with the same letters are not significantly different (ANOVA with Tukey test, p<0.05).



View of field experiment (Trial A) on 25 MAY 2009

Conclusions

Our study indicates that cultivar choice can be an effective preventive pest management strategy in organic artichoke production. Low infestation levels of aphids can be tolerated since use of organic pesticides not necessarily results in higher bud yields, even if aphids are significantly reduced.