Liz Copas November 2005

NEMATODES FOR THE CONTROL OF CODLING MOTH
NACM Trial 2005/1

Trial contacts

Orchard manager: Martin Ridler, Gaymers Cider
Becker Underwood: Cyrille Verdun
Records and assessments: Liz Copas and Jean Fitzgerald.

Objective

To assess the effect of specific moth parasitic nematodes on the numbers of codling and tortrix moths and any reduction in the damage caused by them to fruit in a cider orchard.
The nematodes infest the moth pupae in the later stages of their over-wintering period whilst still on the orchard floor or sheltered in crevices in the tree bark. The easiest method of assessing their impact on the pests is by observing changes in the numbers of surviving male moths caught in pheromone traps.
Further records were made of the damage caused to Michelin and Chisel Jersey fruit later in the year.

Spray application

The site of approximately 1ha at Gaymers' Stewley south orchard was sprayed, 24th April 2005, with a suspension of nematodes in water, [Nemasys CM, specific parasites of moth larvae, supplied by Becker Underwood, Littlehampton, Sussex] using a conventional airblast sprayer at approximately 100 galls per acre. In order to prevent desiccation of the nematodes and provide good conditions for their activity, spray needs to be applied during damp weather once temperature is around 14^0C.
The sprayed area is 11 rows wide and the rest of the orchard [of > 20 rows] was unsprayed. Tree spacing 6 x 3m [20 x 10']

Pheromone moth traps

Initial traps, for both codling moth [*Cydia pomonella*] and fruit tortrix moth [*Adoxophyes orana*] were put out 24/05/05 approximately 60m apart, 2 of each in the centre of the sprayed area and one of each in the centre of the unsprayed area.
A further two traps of each pheromone were put out in the unsprayed area on 3/06/05.
Lures for both moths were changed on 28/06/05.

Pest-Man codling prediction

Date of first flight in this area was predicted for 13th May with a peak for the first generation on 2nd June.

Results

Pheromone trap catches

Table. 3 shows that consistently and significantly more codling moth males were caught in the unsprayed area throughout the trial.
Moth catches began building up in late May, numbers in the unsprayed block quickly exceeding the recommended action threshold of 5/trap/week. Catches reached excessive records in June and remained well above the threshold until mid July.
Initially, more tortrix males were caught in the unsprayed area but after the end of June numbers tailed off in both trial blocks. There is evidence of a second generation in late July that was unaffected by the nematodes.

First fruit damage assessment: 6th September 2005

30 trees each of Michelin were selected and codling damage, numbers of rots on the tree and ground assessed. Slightly more damage was seen in the unsprayed area.

Table 1

Pheromone Treatment	Codling damaged fruit/tree	Total rots/tree
Michelin sprayed	14.0	3.3
Michelin unsprayed	18.6	5.4

Final fruit damage assessment: 19th October 2005

The number of rots and codling damaged fruit was counted from the dropped fruit under Chisel Jersey trees.

Significantly more moth larval damage was seen in the unsprayed area but the percentage of rots was similar in both areas.

Table 2

Pheromone treatment	% codling damaged fruit	% fruit with brown rot	Number of fruit sampled
Chisel Jersey sprayed	6.3	3.5	1321
Chisel Jersey unsprayed	23.9	2.0	1107

Conclusions

In this trial the nematode application had a useful impact on the codling moths but had little effect on tortrix. In the case of the codling moth the effect is extended to the end of the season with a significant reduction in the number of codling damaged fruit.

The success of the nematode application depends on a temperature above 14^0C and damp conditions for the first few hours after spraying. Waiting for these conditions meant that the spray was applied after some of the codling may already have hatched.

The variety Chisel Jersey is a late flowering and later maturing variety which normally escapes attack from apple sawfly, the major pest to initiate brown rot infection in fruit. This may explain why low numbers of rotting fruit were seen although codling damage was significant.

In other varieties where brown rot is a problem, Dabinett and Michelin for instance, this level of codling damage would definitely have resulted in significant losses as a result of rots.

Liz Copas and Jean Fitzgerald
November 2005.

Table 3: **Pheromone trap catches** [traps put out 24/5/05]

24/5 – 7/6/05	Sprayed		Unsprayed		% reduction
Codling moth	Trap 1	8	Trap A	44	83
	2	7			
Tortrix	1	0	A	0	
	2	1			

7/6 – 13/6/05	Sprayed		Unsprayed		% reduction
Codling	Trap 1	15	A	[4]	
	2	14	B	46	59
			C	56	
Tortrix	1	1	A	0	
	2	1	B	3	
			C	0	

13/6 – 28/6/05	Sprayed		Unsprayed		% reduction
Codling	Trap 1	38	A	15	
	2	11	B	125	75
			C	152	
Tortrix	1	48	A	27	
	2	43	B	80	
			C	63	
Lures changed 28/6/05					

28/6 - 12/7/05	Sprayed		Unsprayed		% reduction
Codling	Trap 1	110	A	89	
	2	48	B	195	48
			C	170	
Tortrix	1	21	A	12	
	2	25	B	22	
			C	19	

12/7 – 25/7/05	Sprayed		Unsprayed		% reduction
Codling	Trap 1	9	A	6	
	2	7	B	50	77
			C	47	
Tortrix	1	2	A	6	
	2	0	B	4	
			C	3	

Final catch prior to removal of traps [1 week only]

24/7 – 1/8/05	Sprayed		Unsprayed		% reduction
Codling	Trap 1	1	A	1	
	2	1	B	7	86
			C	14	
Tortrix	1	23	A	11	
	2	30	B	20	
			C	18	