

Progress in pest management in organic strawberry production



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NORSØK Norwegian Centre for Organic Agriculture

InsectTrap (2016): Testing insect funnel traps baited with a mixture of a attractive **plant volatile and pheromones** for the strawberry blossom weevil (*Anthonomus rubi*) in a mass trapping study



0.5 L water with soap in the bucket to kill the insects

Funnel leading into the bucket



Odour sachets

A mesh on the top of the funnel to prevent bi catches of other species

Test field:

- Conventional two year old strawberry field (type Korona)
- Insect damage observed pervious year
- Surrounded by other strawberry fields
- Both test field and control field were treated with insecticides

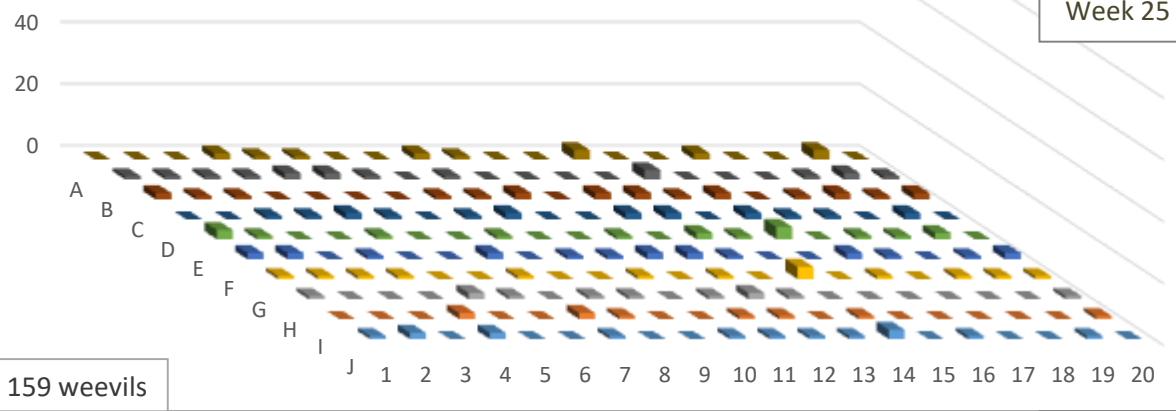
InsectTrap



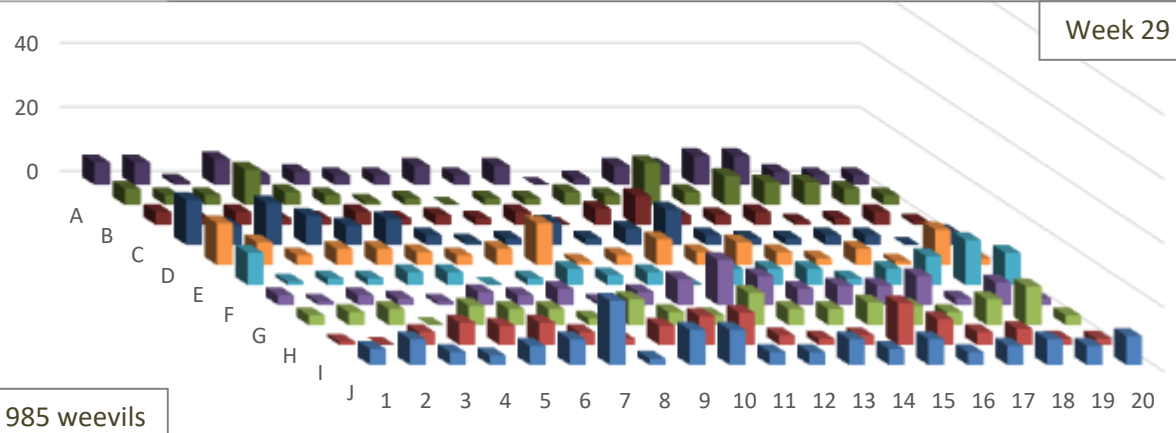
- 200 insect traps, 20 rows each 10 traps
- 4 m between each trap
- All traps checked every four weeks
- Six test and six control points of 1 m
- Volatile baits changed once during the season



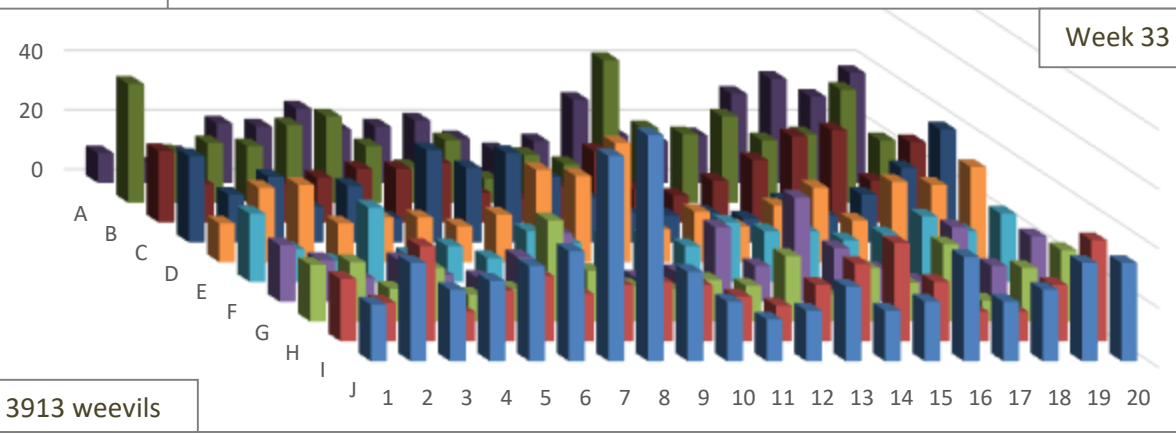
Parental generation
(overwintering)



Offsprings



Offsprings



Strawberry harvest
week 29-33

Week 25	Blossom/green berries	Healthy buds	Cut buds	Damage
Test 1	208	200	50	10,9 %
Test 2	246	168	54	11,5 %
Test 3	298	252	223	28,9 %
Test 4	318	464	75	08,8 %
Test 5	280	205	97	16,7 %
Test 6	155	185	77	18,5 %
Total	1505	1474	576	16,2 %
Control 1	192	128	61	16,0 %
Control 2	251	181	42	08,9 %
Control 3	322	287	116	16,0 %
Control 4	258	349	207	25,4 %
Control 5	245	135	50	11,6 %
Control 6	190	65	42	14,1 %
Total	1458	1145	518	16,6 %

Discussion

- In the treated area no reduced pest damage or increased strawberry yields (not shown) were recorded.
- Although high catch rate of the new generation of the weevils, only 159 weevils were caught during the first four weeks. This was too few weevils compared to the whole population to reduce the pest damage.
- Ineffective traps or/and volatile bait?

Conclusion

- In this two year old strawberry field, infested by strawberry blossom weevils, it was not possible to reduce pest damage using insect funnel traps baited with plant volatile and pheromones.

2017

FenceTrap - Combined use of insect fencing and trapping to manage the strawberry blossom weevil

O₃Berries – Use of ozone (O₃) dissolved in water for treatment of strawberry plants to manage fungi infected diseases as Botrytis



Mesh 0.8 x 0.8 mm²

230 cm

Overhang on the outside to prevent insects to crawl over the fence



Gates for tractors and strawberry pickers





Insect traps on both inside and outside of the fence

The whole field 0.42 ha

36 m

116 m

The field ready to be planted



Control points

If successful, the fence will be maintained for three years

The field surrounded by cereals.
Other strawberry fields near by.

Botrytis infested strawberries



Ozone dissolved in water for fungi pest control

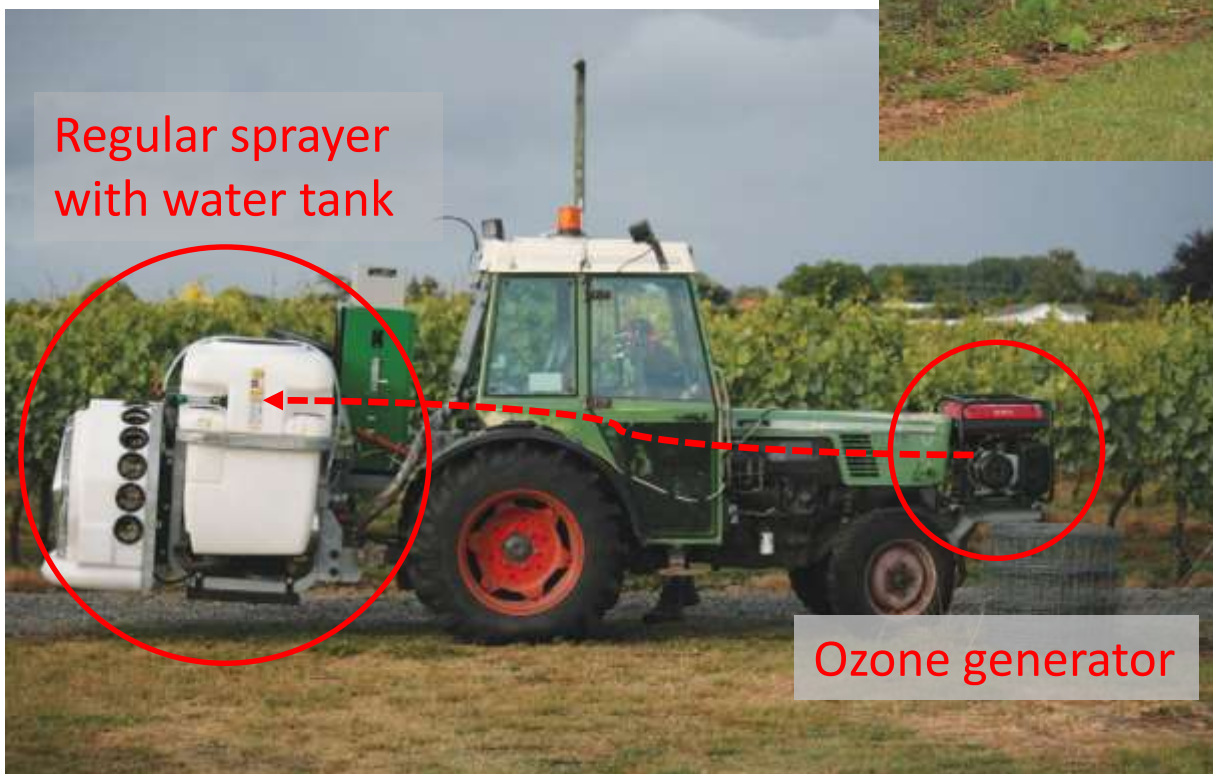
- Used in vineyards at some places in USA and New Zealand. Also tested in Europa.
- Good results on mildew and botrytis compared to fungicides and control.
- Effect of ozone in post-harvest products well documented (in USA approved for use in food processing and storages)
- In Europa ozone frequently used in disinfection of water, at dairies, slaughterers, fish farms, health care centres, restaurants
- Lack of research on the effect of this treatment in the field.

Why OZONE?

- **Ozone** is generated on-site at low concentrations and pressures, and then immediately used in the treatment process. Hence, there are no concerns about safe storage and handling.
- **Ozone** dissolved in water has a short life span (halftime 20-30 min.) so any accidental release of ozone is not harmful.
- The **ozone** molecule (O_3) breaks down into stable oxygen (O_2), thus **NO** residues are left behind.
- Because of **ozone's** effective mechanism, pests cannot develop resistance to ozone.
- **Ozone** is not a carcinogen and dissolved in water not harmful for human health

From:
Rumela Bhadra
Resource July 2015

Ozone in the vinyard, New Zealand



Regular sprayer
with water tank

Ozone generator

From:
Tessa Nicholson
NZ Wingrower Feb/Mar 2016



Aim of pre-test:

- To see if water with ozone has negative effect on strawberry plant performance

Treatment:

- Water
- Water with 5 ppm ozone
- Water with 10 ppm ozone

31. March 2017
Right after first
treatment



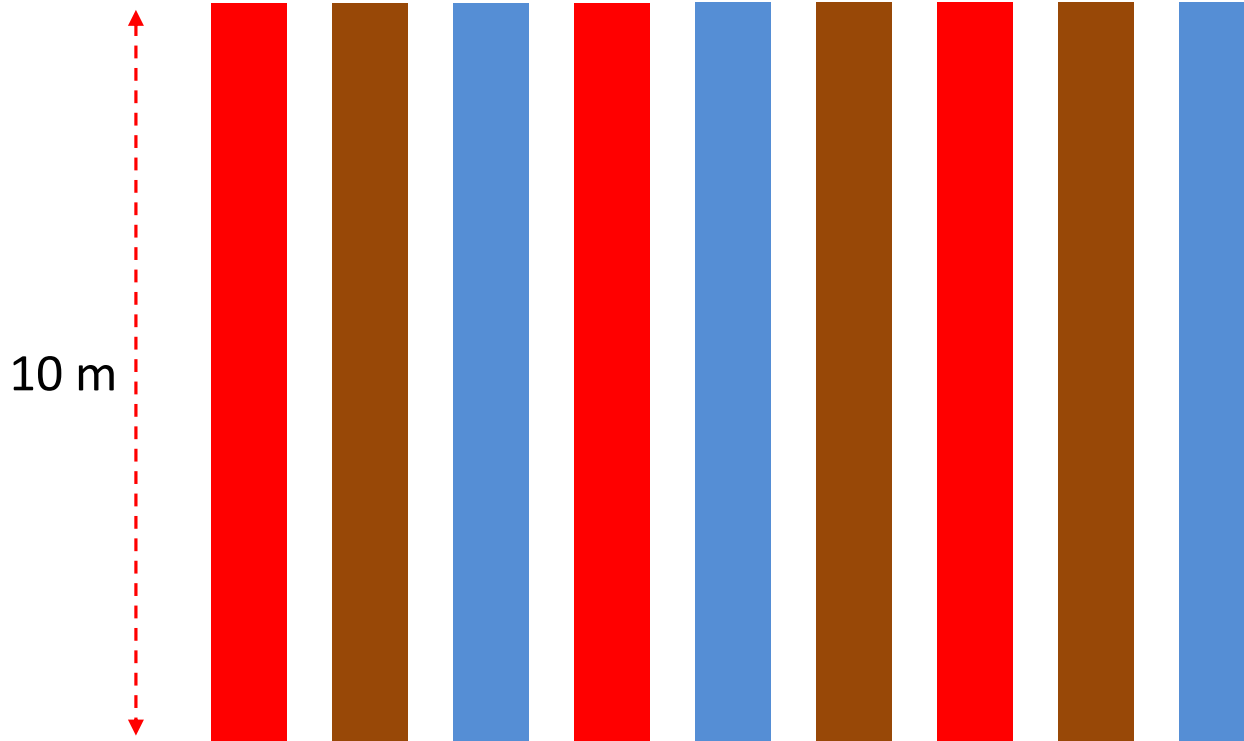
O₃Berries

5. April 2017
Just before second
treatment





7. April 2017
Seven days after first treatment and two days after second treatment



- Water
- Water and ozone
- fungicides

Strawberry field with double rows. First treatment in June. Thereafter, treatments every week throughout the season.



Partners

- NORSØK Norwegian Centre for Organic Agriculture
- NLR Norwegian Agriculture Extension Service
- REDOX AS
- Arne Moxness (host for field trials)