IMPROVED METHODS OF MASS TRAPPING OF FRUIT FLIES AND OTHER PESTS

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The National Institute of Horticultural Research

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Fruit flies affecting crops in Poland

Rhagoletis cerasi

Sweet and sour cherry, Lonicera caerulea var. kamtschatica

Rhagoletis cingulata

Sweet and sour cherry

Rhagoletis batava

Seabuckthorn

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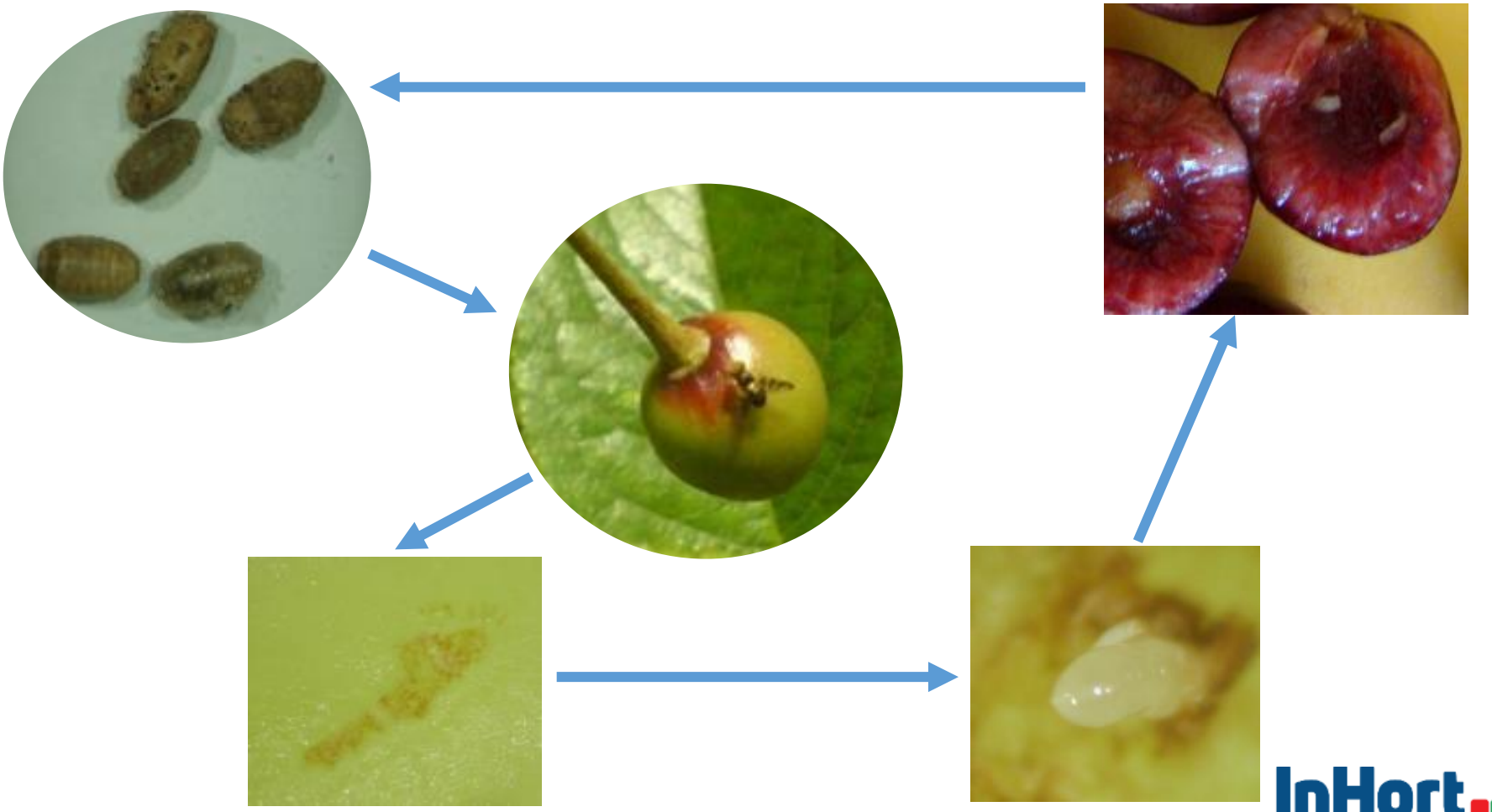
Fruit flies biological cycle



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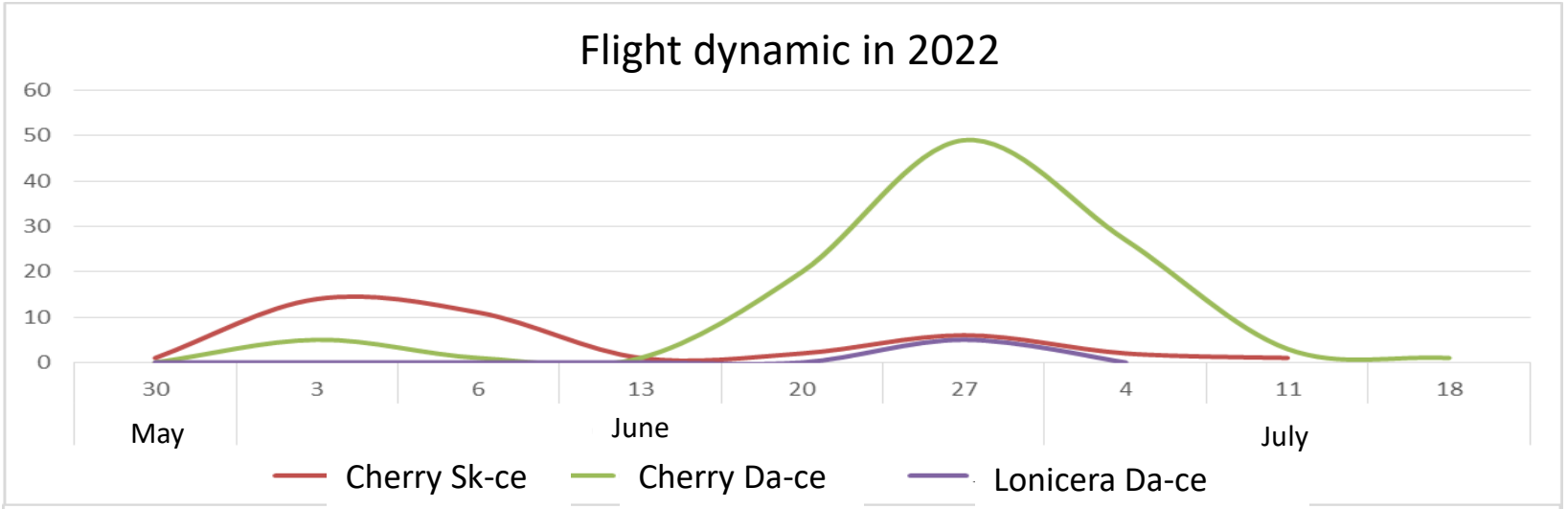
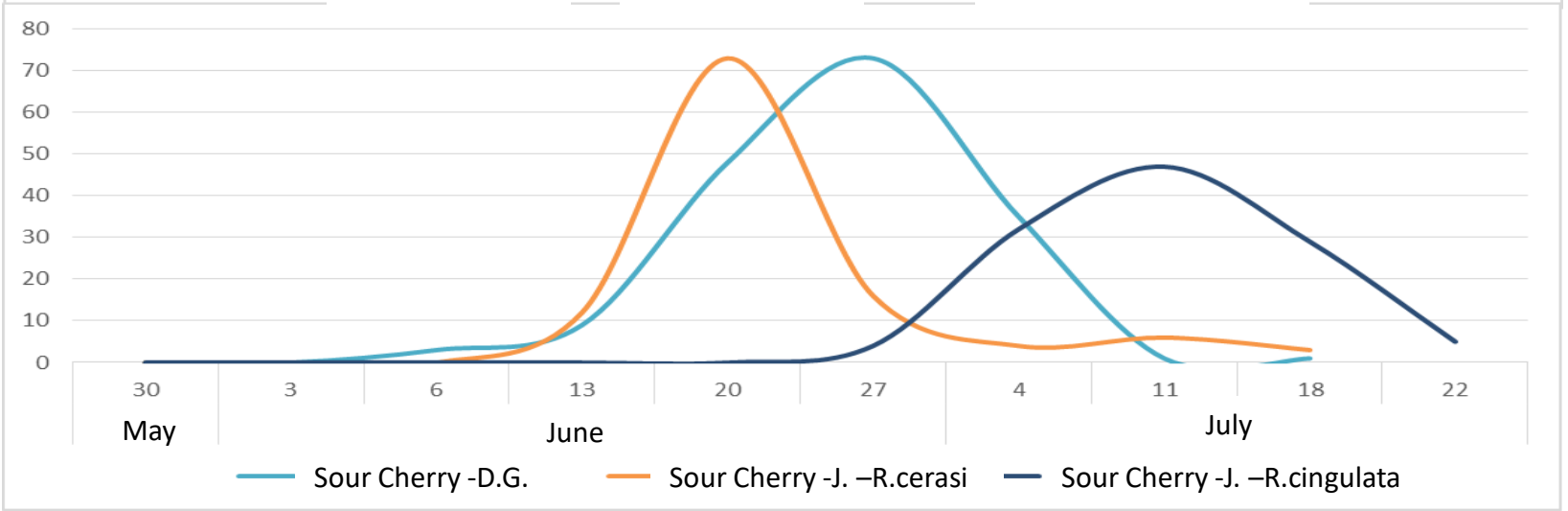
Rhagoletis batava impact on seabuckthorn (Hippophae rhamnoides)

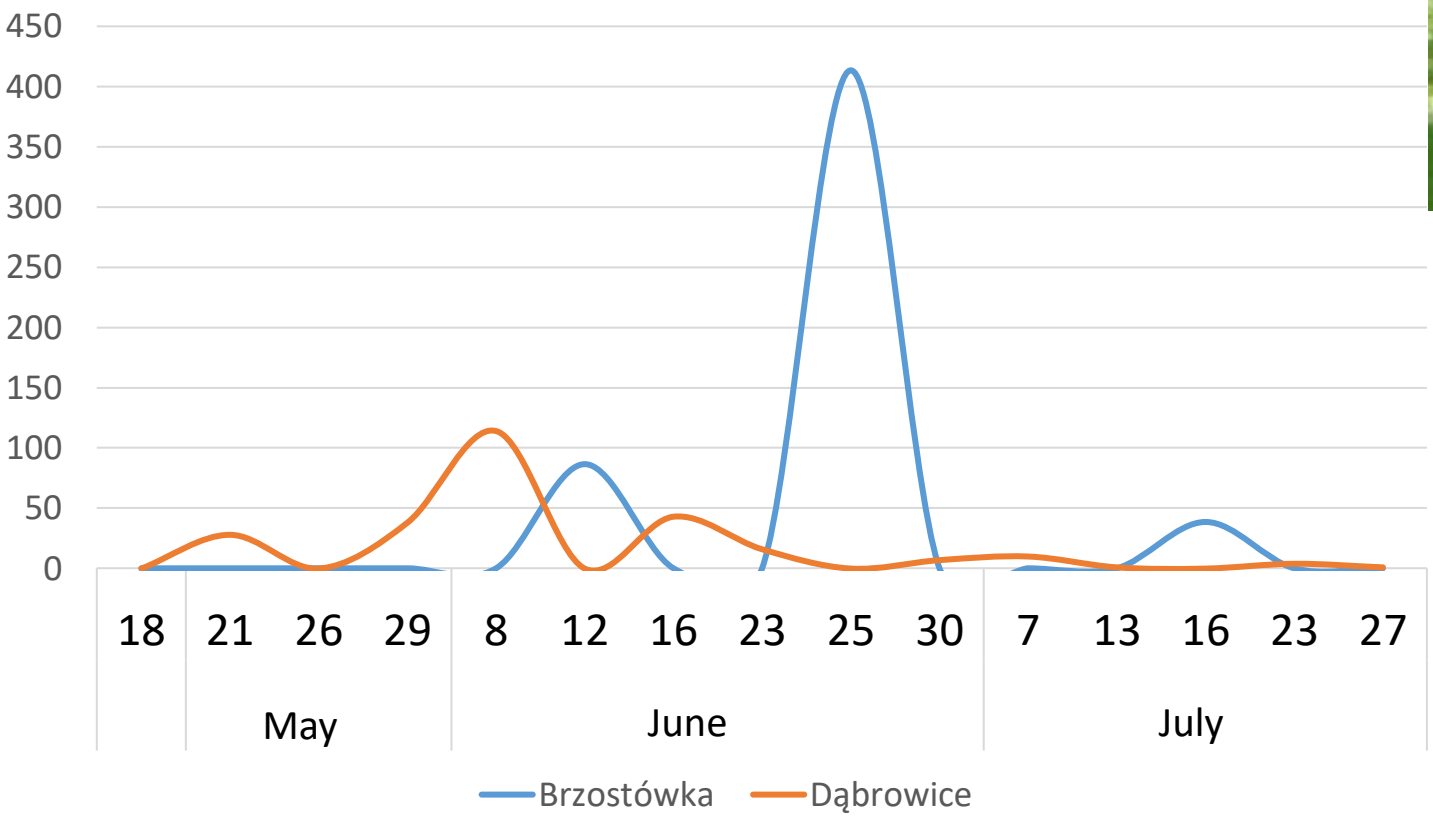
Monitoring of fruit flies

Threshold : on average 2 flies/trap





Flight dynamics of *Rhagoletis cerasi* adults on Kamchatka berry plantations in the eastern and central regions of Poland



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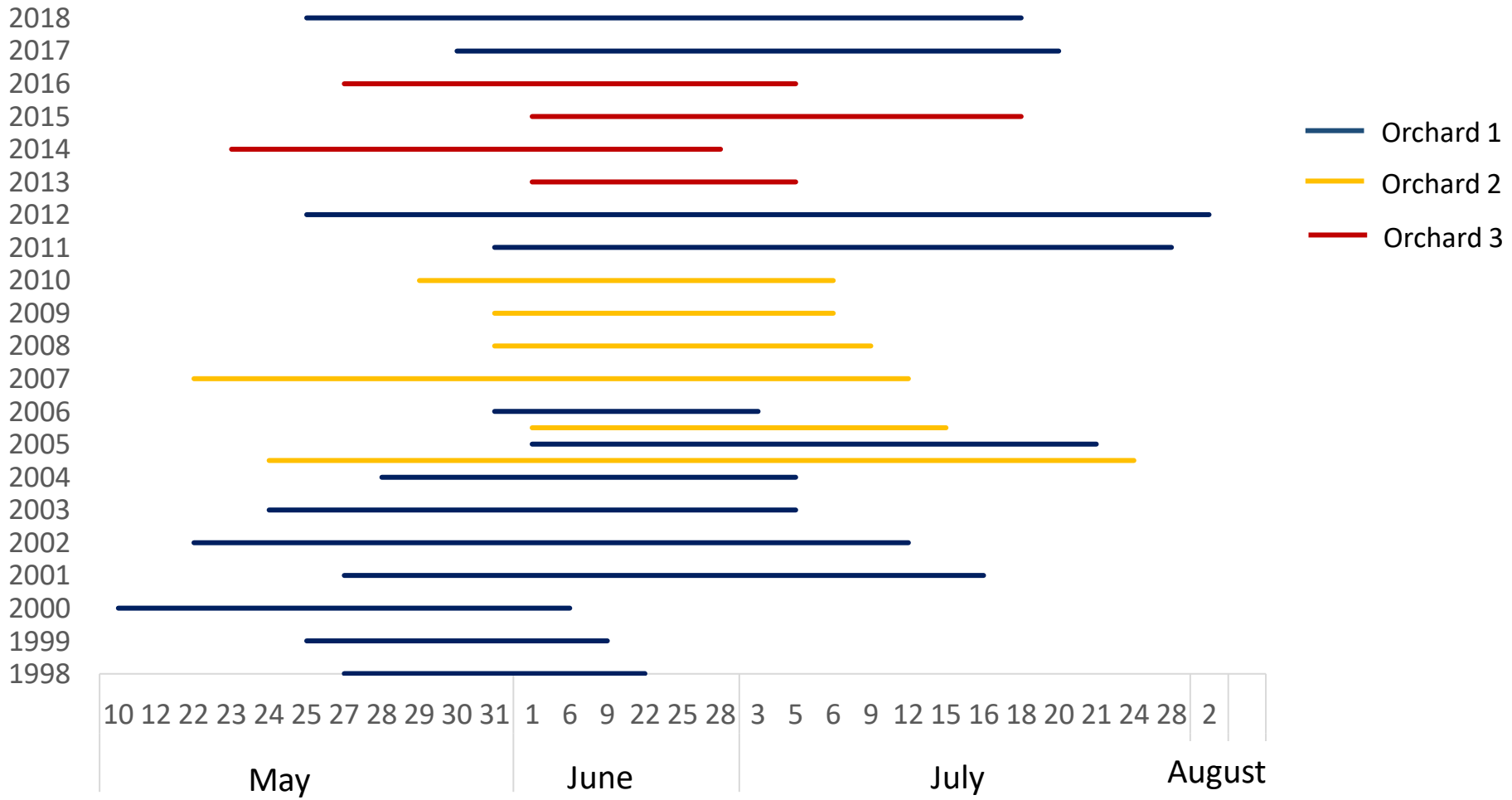
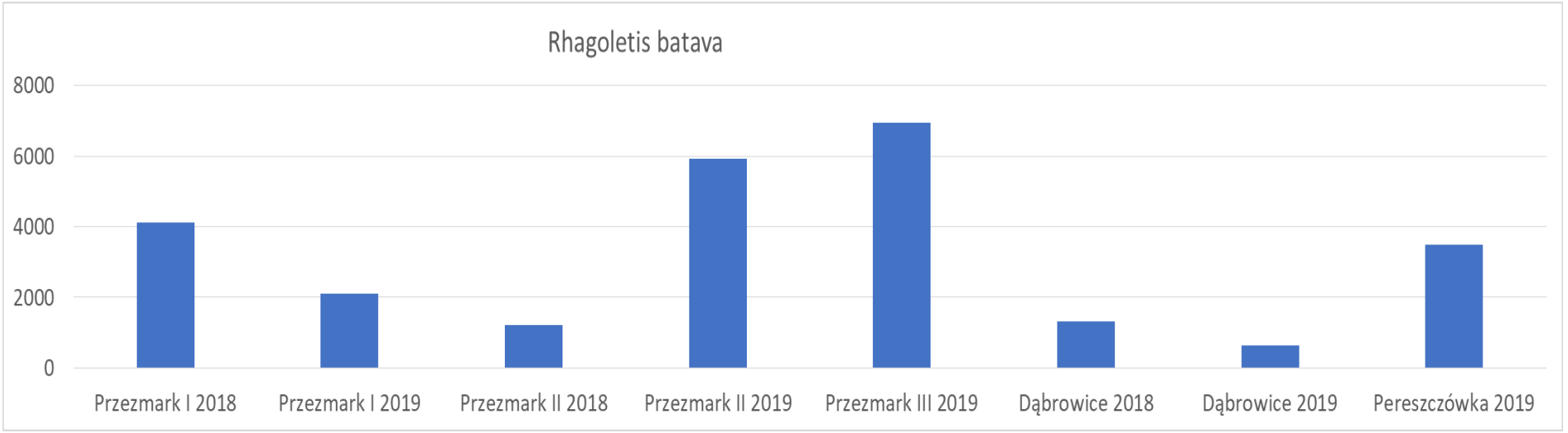
Flight dynamics of *Rhagoletis cingulate* adults on sweet cherry orchards in central Poland on 1998-2018



Monitoring *R. batava* flight



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Monitoring *R. batava* flight

Geographical location	Flight start	Average numer of adults catched/trap during the season
Northern	15.06.2018	4920
	22.06.2019	6947
	20.06.2020	3455
	19.07.2021	416
Eastern	13.06.2020	1140
	22.06.2021	709
Central	03.06.2020	87
	14.06.2021	49

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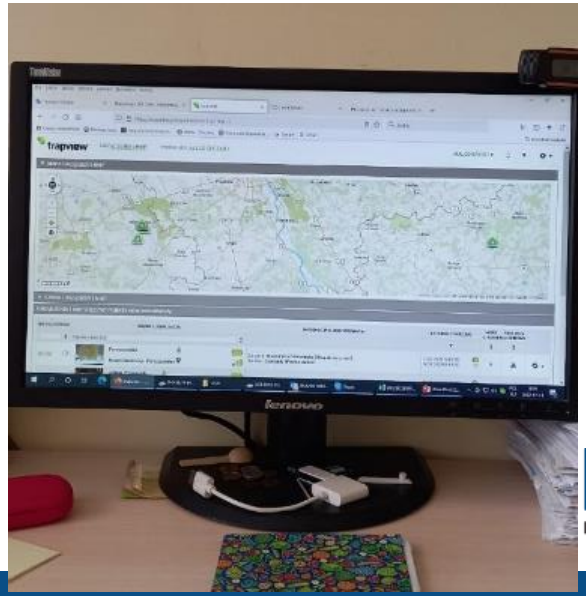
Elements of precision agriculture in flies monitoring

iSCOUT® COLOR TRAP by
METOS® PESSL INSTRUMENTS



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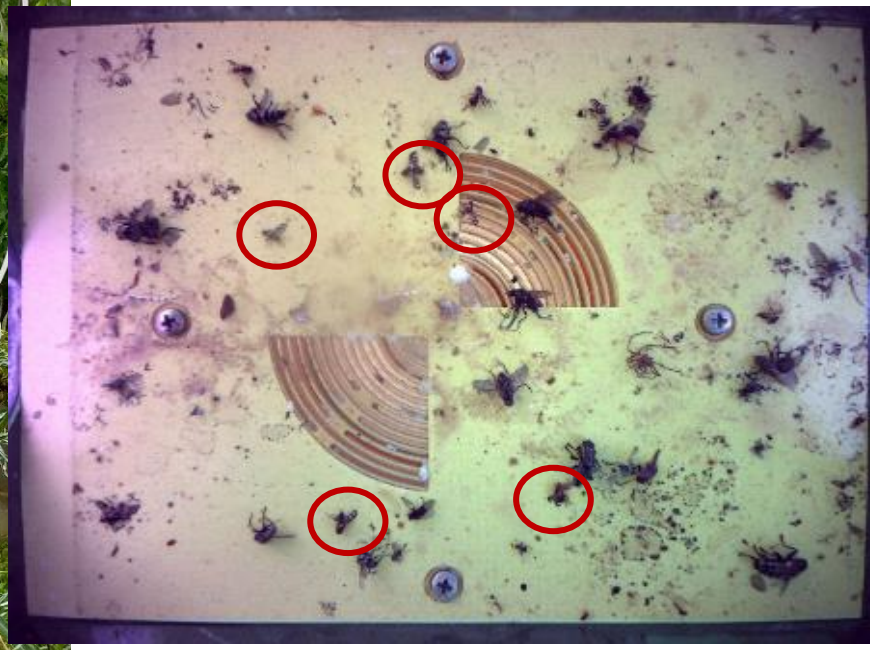
Elements of precision agriculture in flies monitoring

TRAP VIEW by EFOS Slovenia

Elements of precision agriculture in flies monitoring

iSCOUT® FRUITFLY by METOS



self-prepared attractant
(4% NP+S fertiliser solution
based on ammonium phosphate)

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Trials to limit *R. batava* population

Mass trapping

Sticky trap (T)

Home made 4% water solution ammonium phosphate fertilizer (A2D or A2H)

Conical with lure for *C. capitata* (ProboDelt) (A3)

Home made ammonia-based attractant with anchovy (A4)

Approx. 80 traps per hectare

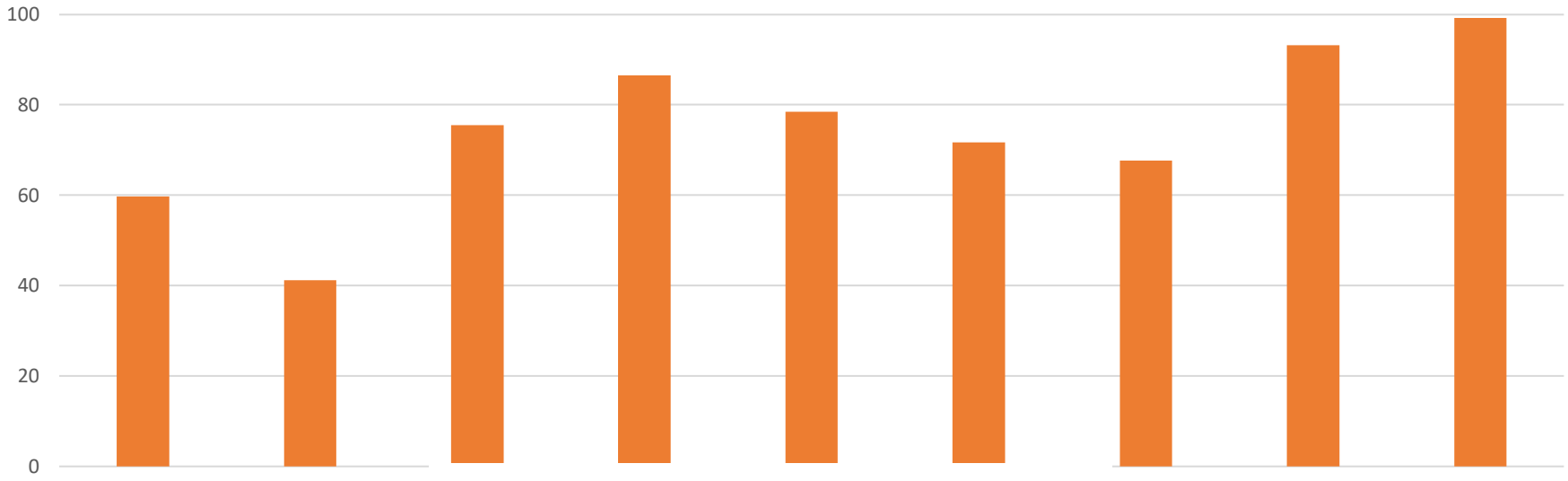
Deployed just before the start of the flight

Trials to limit *R. batava* population

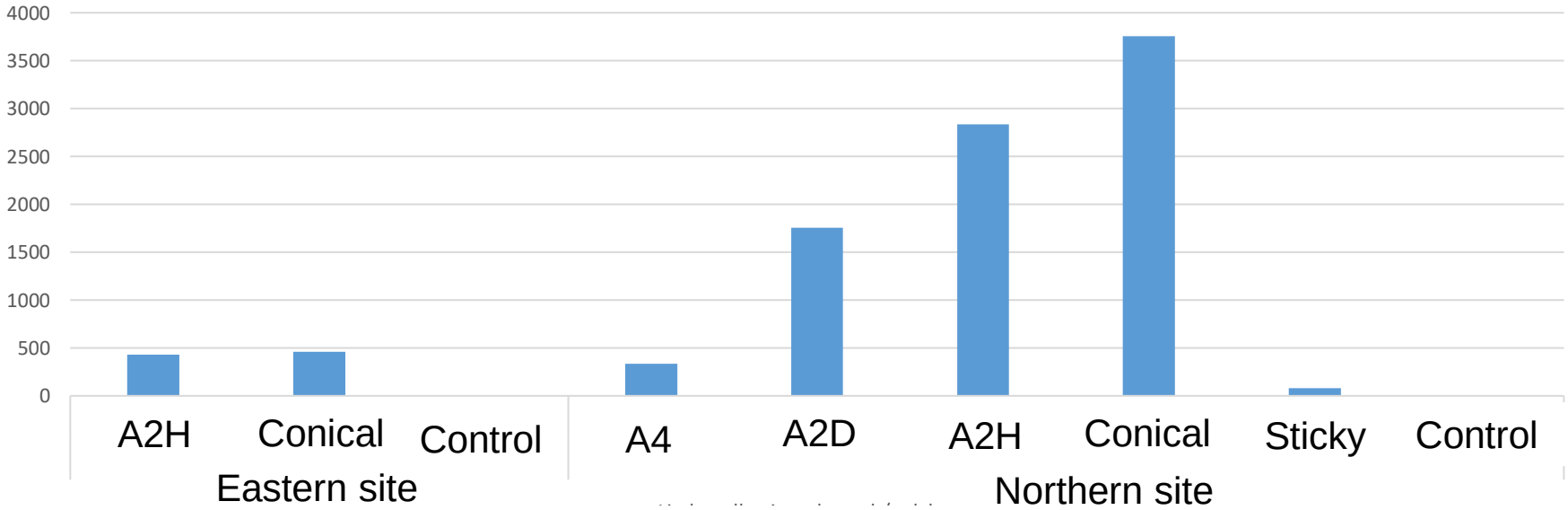
Fruit damage assessed at harvest
(4 samples x 100 fruits)

Assessment of flies caught several times during the season

Trials to limit *R. batava* population



Percentage of damaged fruit

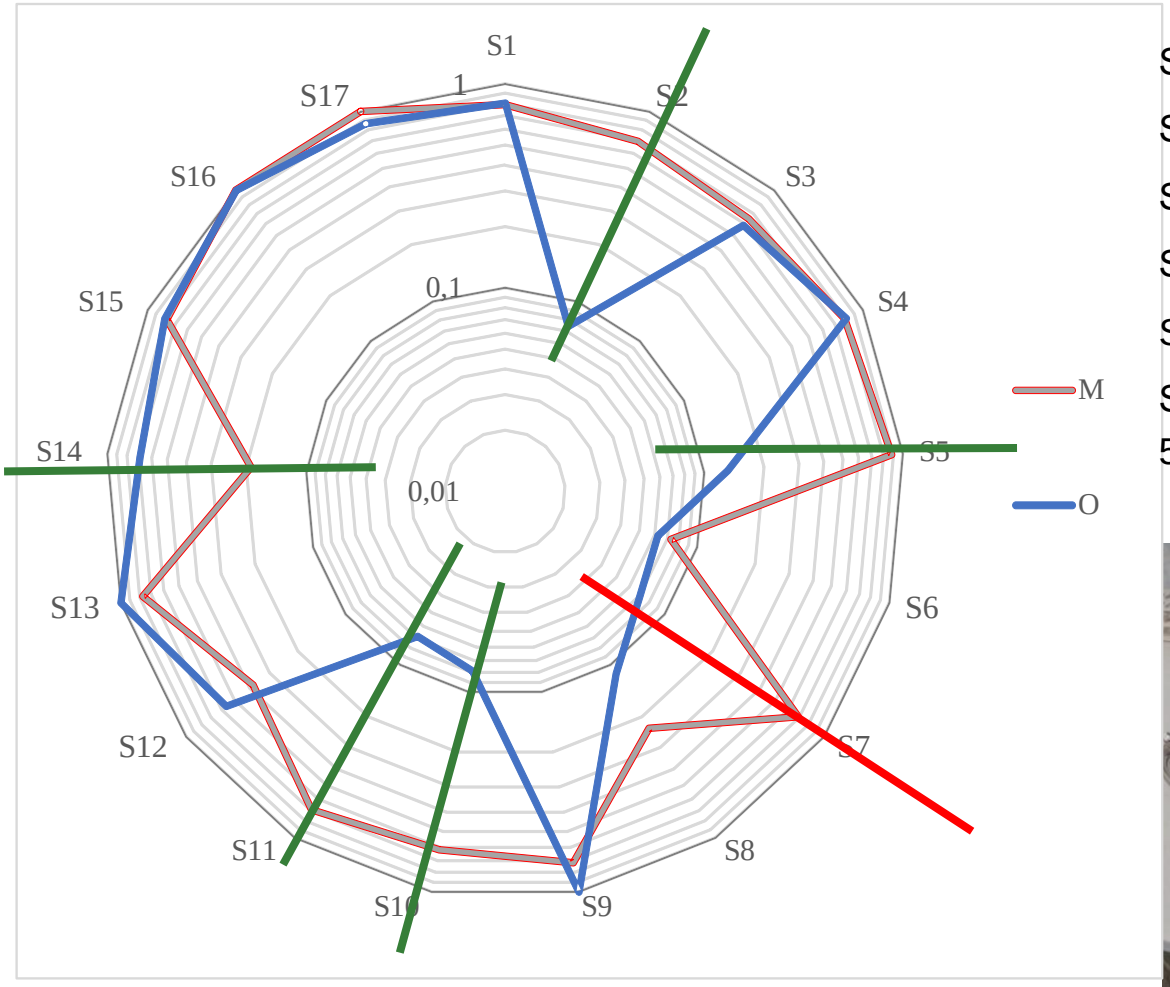


Total number of flies caught in traps

Comparison of trap lures using an electronic nose

C. capitata vs. 4% ammonia fosfate solution

Organic lure (O)
Mineral lure (M).



S2 – NH_3, H_2S, C_2H_5OH, C_6H_5-CH_3 1-30ppm

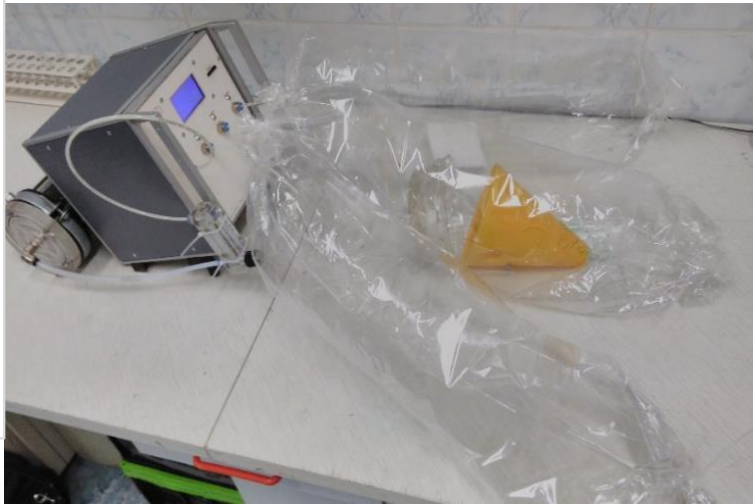
S5 – Ethyl alcohol, 50-5000ppm

S7 – Ammonia 10-100ppm

S10 – Hydrogen sulfide 5-100ppm

S11 – flammable gases 500-10000ppm

S14 – Metan, isobutan, hydrogen, CO 100-5000ppm



Efficacy of new attractants in trapping different fruit flies species

	Species	Number of flies caught/trap/season								
		Attractant								
		2019			2020					
		A1	A2	A3	A2	A3	1A1	1B1	2A1	2B1
Sweet cherry										
Skierniewice	R.cerasi	124	**283**	38	0	294	**304**	254,5	279,5	154
	R.cingulata	**36**	22,5	3	0	1	**2**	0	0	0
Sour cherry										
Józefatów	R.cerasi	**340**	104		65	59	**103,3**	79,7	77,3	46,3
	R.cingulata	**21**	10		**74**	32	51,3	20	25,3	32,7
Kamczatka berry										
Przezmark	R.batava	629	322	**922**	191	75	474	506,7	388,7	**537**
Pereszczówka	R.batava	1011	655	**1301**	296	175	369,3	**1021,7**	901,7	654,3

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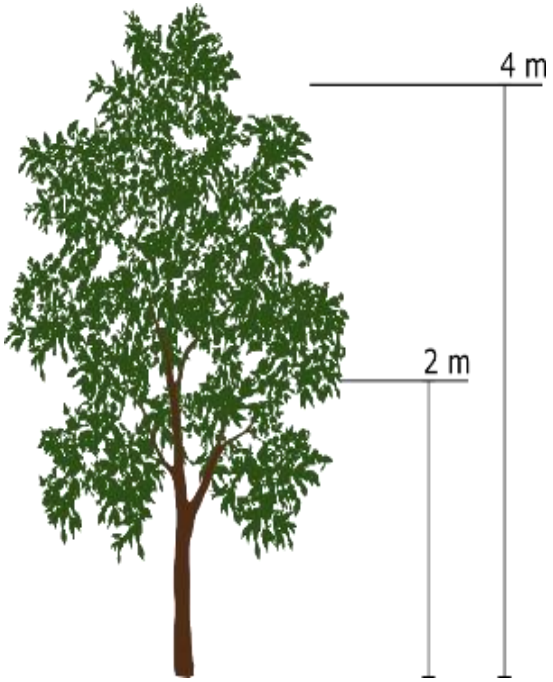
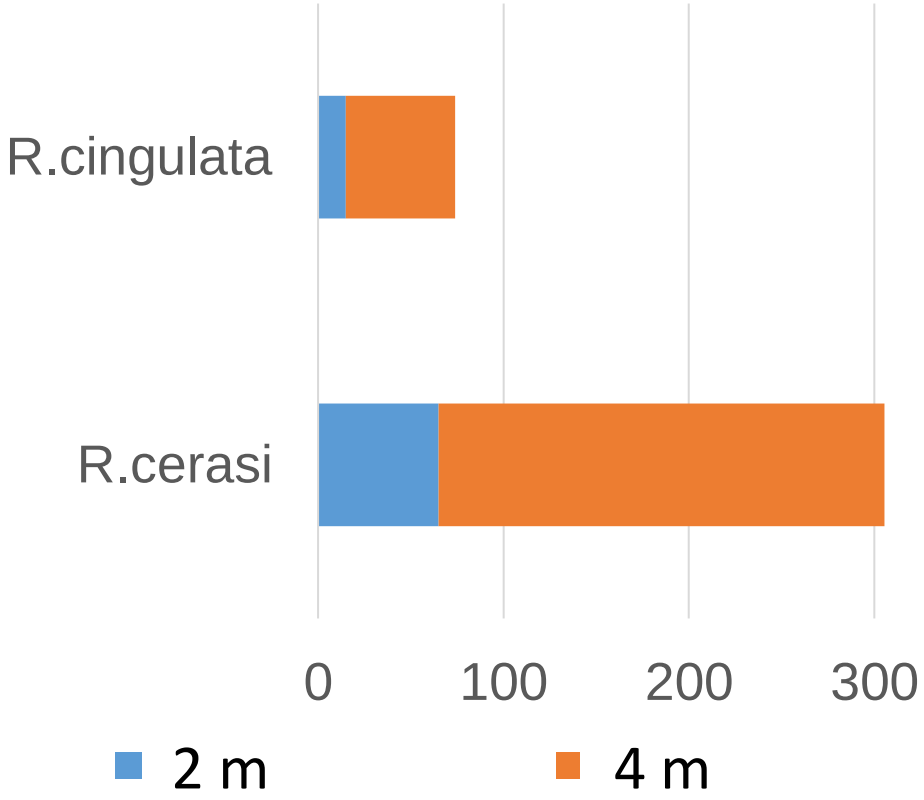
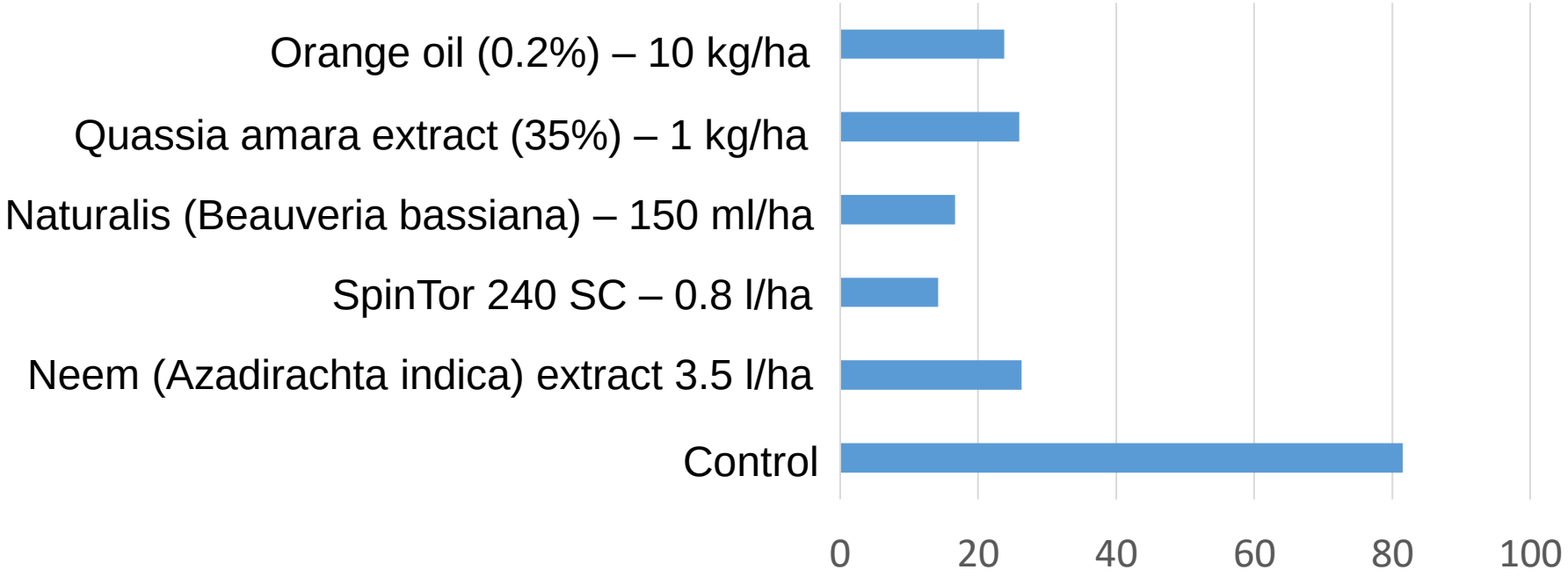
Trapping efficiency of *R. cerasi* and *R. cingulata* flies depending on the height of the trap suspension





Control of *R. batava* population



Applications: 15.06, 6.07, 23.07, 9.08.2018

Percentage of damaged fruits

Treatment	Efficacy [%]	
	2018	2019
Control	-	-
NeemAzal - 3.5 l/ha	67,7	0,0
SpinTor 240 SC - 0.8 l/ha	82,6	34,1
Naturalis - 150 ml/ha	79,5	12,9
Citrus oil - 10 kg/ha	70,7	8,0
Quassia - 1 kg/ha	68,1	18,6

Crops affected by larvae of M. melolontha

Raspberry

Highbush blueberry

Lonicera cerulea var kamchatka (Kamchatka berry)

Sour cherry

Apple

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Crops affected by larvae of M. melolontha

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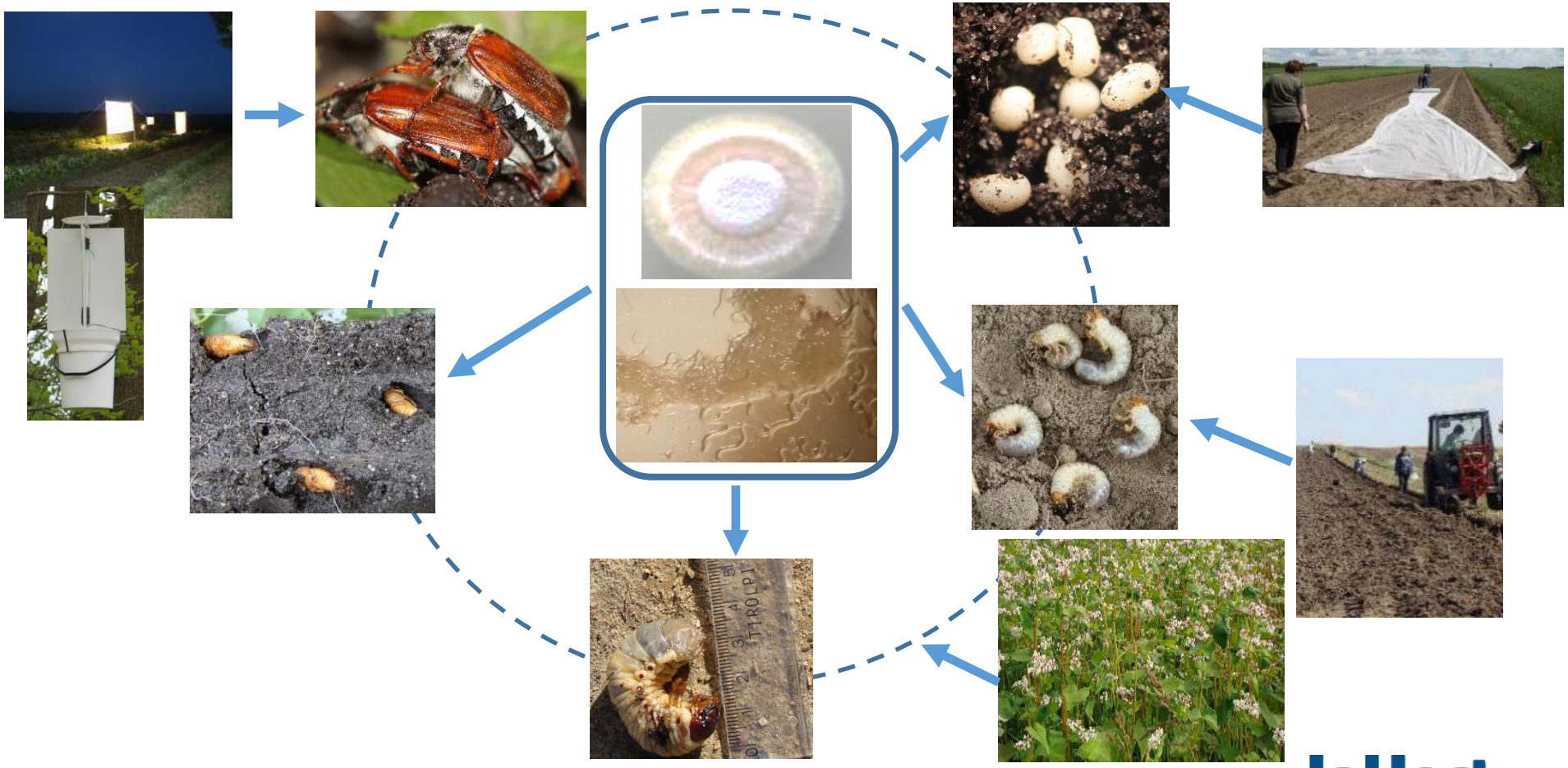
Integrated method of May beetle control



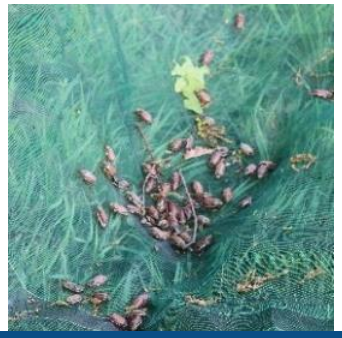
Effect of different kinds of traps

Traps to monitor the flight of adults

14 m2 – trapped 102 adults

„Harvesting” adults from trees

Up to 1000 adults collected at once



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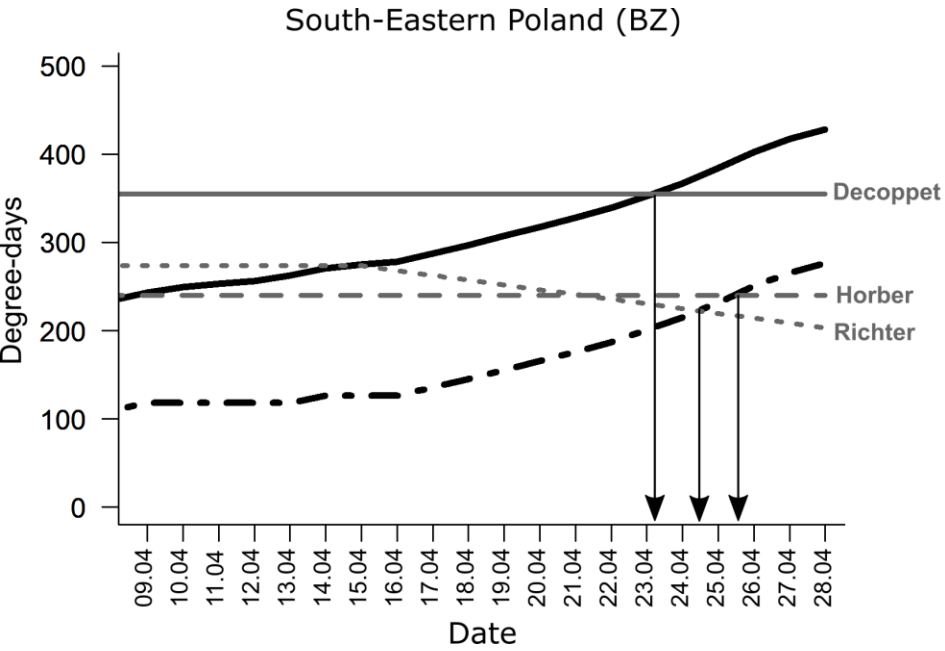
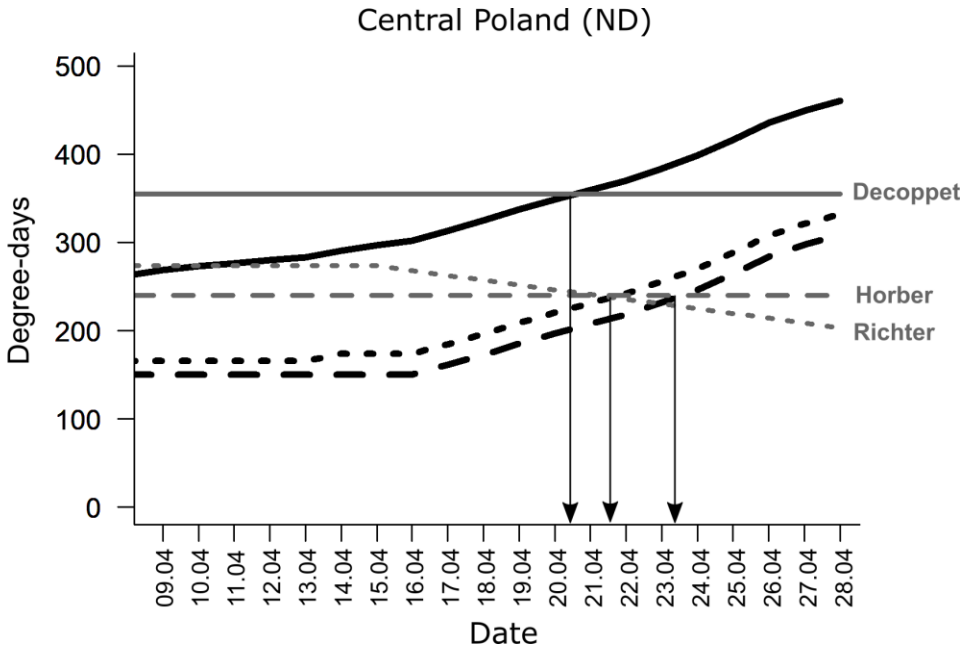
Using models to forecast adults' emergence

Three models were utilized (Decoppet 1920, Horber 1955, and Richter 1969) to verify the suitability in forecasting *Melolontha spp.* adults' emergence from soil and support the timely deployment of the mass traps.





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Effect of different kinds of traps for mass trapping

Light traps

Within 2 hours it is possible to attract 250-300 adults/trap

Lure traps

50-100 adults trapped in a week

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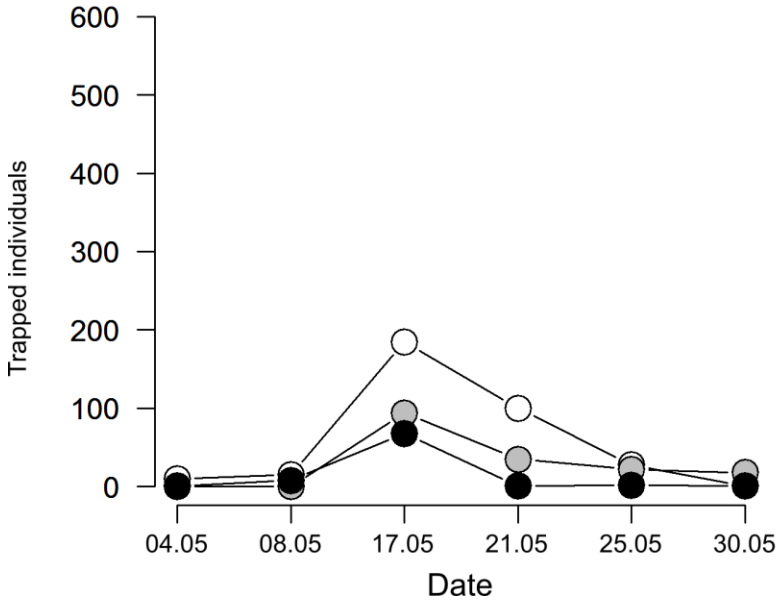
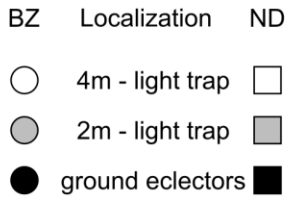
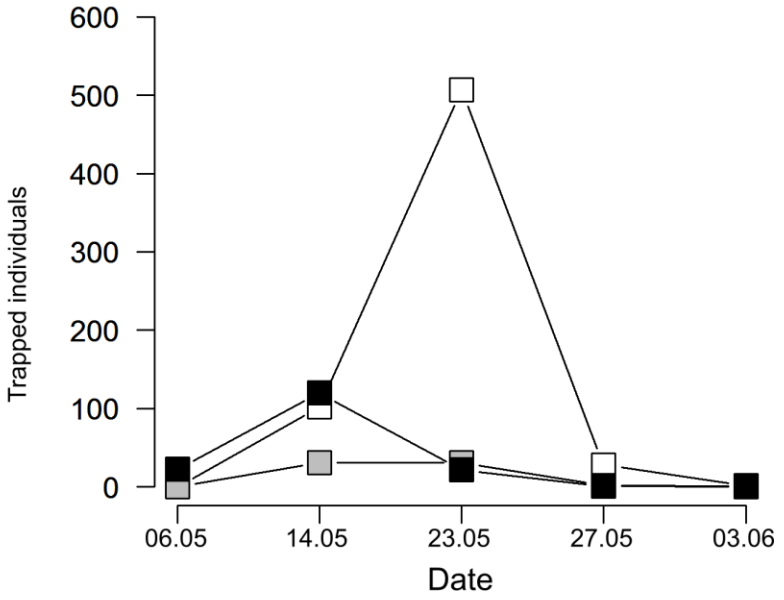
Effect of different kinds of traps for mass trapping

The peak of adults' swarming assessed by the eclectors matched quite well with the numer of adults captured with the light mass trap







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CONCLUSIONS

- An integrated approach including monitoring, mass trapping and applicaiton of natural products can help controlling fruit flies without the need of several applications of chemical pesticides.
- In case of soil-borne pests, tackling all phases of the biological cycle with different approaches can allow an efficient control of the pest, without any need ot chemical treatments.

CREDITS

- Małgorzata Tartanus
- Ewa Furmanczyk
- Tomasz Miskiewicz
- .....
- Several farmers

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THANK YOU FOR THE ATTENTION

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