

Improving plant quality and economy for a more sustainable and efficient berry production

Different systems of strawberry and raspberry plant protection

Acronym: QualityBerry

Contract number: NOR/POLNOR/QualityBerry/0014/2019-00

Sylwester Masny, the National Institute of Horticultural Research, Skierniewice



Task 3.3. Suitability of selected strawberry, red raspberry and blackcurrant cultivars for IP, IP with limited chemical protection and organic production using preparations against fungal diseases

Strawberry (4 cvs.): Grandarosa, Markat, Florence and Panvik (*control against P. macularis, M. fragariae, D. earliana*)

Three systems of fruit production:

1. Integrated Protection (IP) - standard fungicides recommended in integrated production (Luna Sensation, Switch, Signum, Scorpion),
2. Integrated Protection with the reduction of chemicals (reduced IP) - biological preparations with the support of IP fungicides in conditions of high disease pressure (Luna Sensation, Serenade, Limocide, Scorpion)
3. Biological Protection (ECO) - only biological preparations based on sulfur, essential oils and microorganisms (Limocide, Serenade, ZumSil)
4. Control (no protection)

Assessment:

- the degree of plant infestation by leaf diseases
- fruit yield and its quality



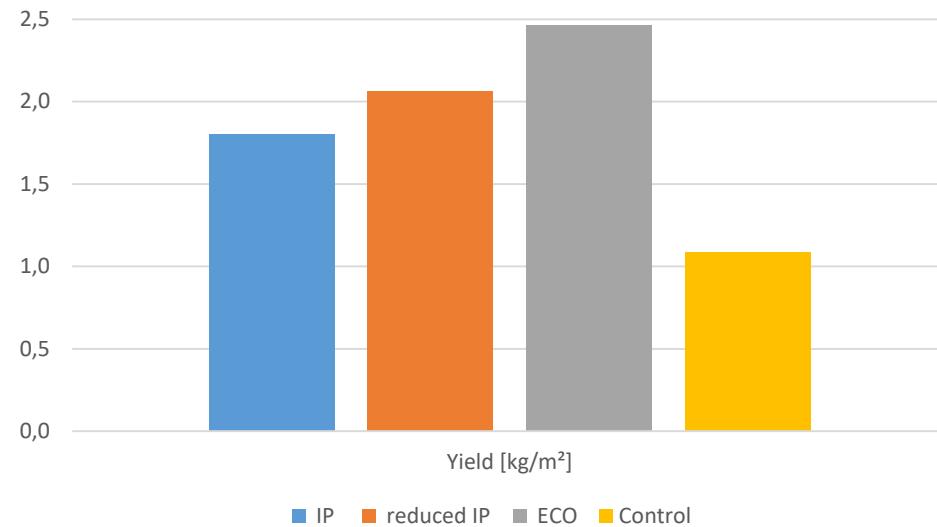
Strawberry protection against diseases in 2022

Tr. No.	IP		REDUCED IP		ECO	
	date	SUBSTANCES	date	SUBSTANCES	date	SUBSTANCES
1	09.05	captan	26.04	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>	26.04	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>
2	20.05	trifloksystrobina	09.05	captan	09.05	<i>Pythium oligandrum</i>
3	06.06	flupyram + trifloksystrobina	1.05	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>	19.05	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>
4	29.06	boskalid + piraklostrobina	20.05	trifloksystrobina	20.05	<i>Pythium oligandrum</i>
5	03.08	azoksystrobina + difenokonazol	03.06	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>	31.05	orange oil
6			06.06	flupyram + trifloksystrobina	03.06	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>
7			29.06	<i>Bacillus subtilis</i>	06.06	<i>Bacillus subtilis</i>
8			03.08	copper oxide	10.06	<i>Pythium oligandrum</i>
9					29.06	<i>Bacillus subtilis</i>
10					03.08	copper oxide

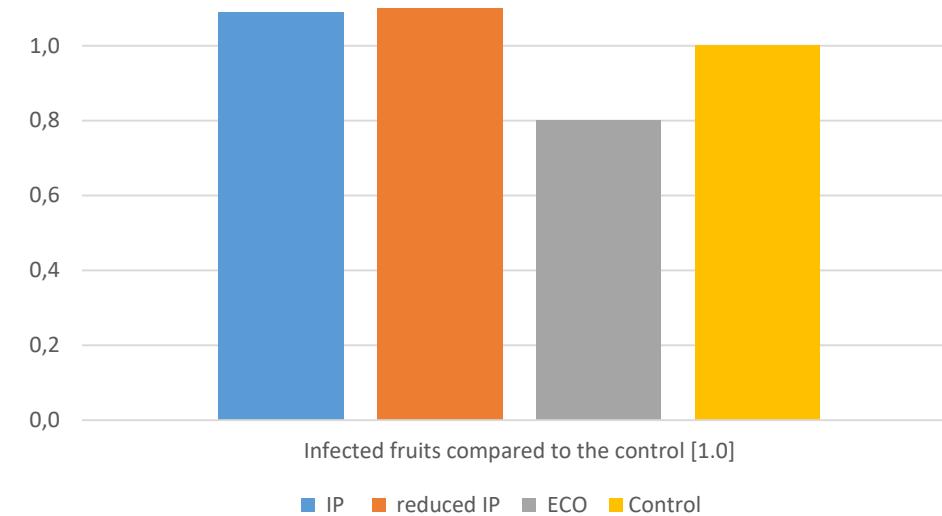
Residues of fungicides in strawberry fruits in 2022

- **IP system:**
cyprodinil, fludioxonil, fluopyram, trifloksystrobin were detected in fruit in all cultivars tested
- **Reduced IP system:**
cyprodinil, fludioxonil, fluopyram, trifloksystrobin were detected in fruit in all cultivars tested
- **ECO:**
no residues
- **Control:**
no residues

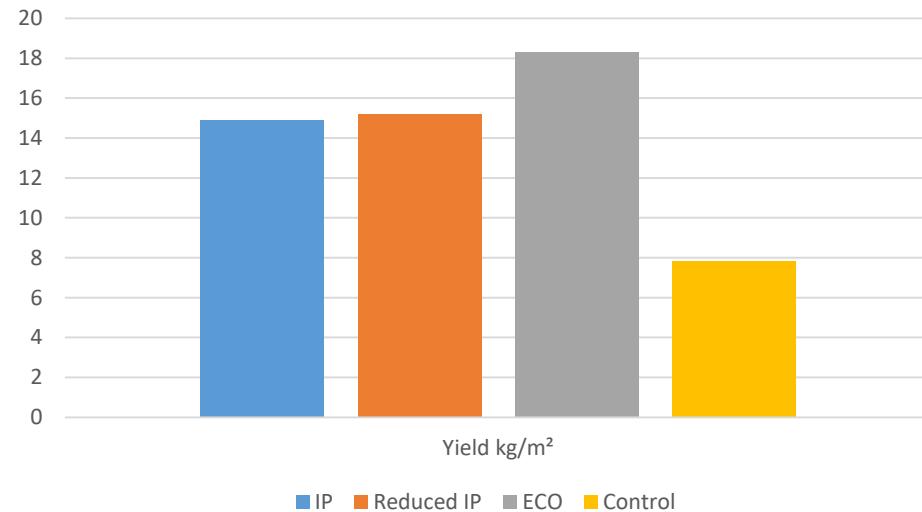
Grandarosa strawberry cv. yield in tested protection systems



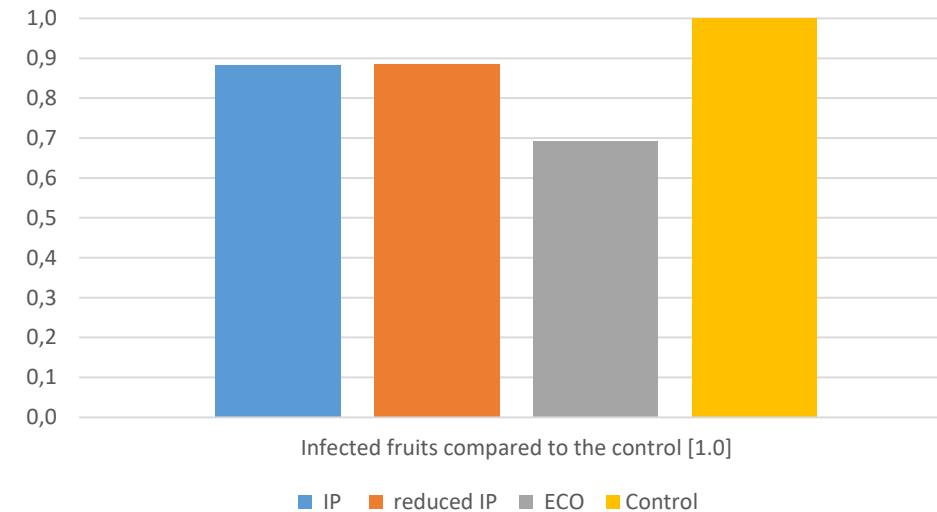
Percent of infected fruits of Grandarosa strawberry cv.



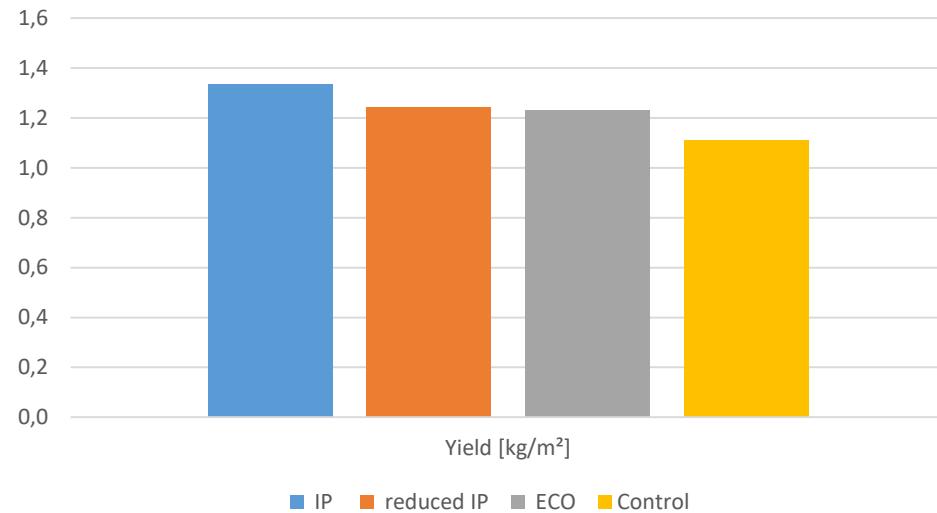
Markat strawberry cv. yield in tested protection systems



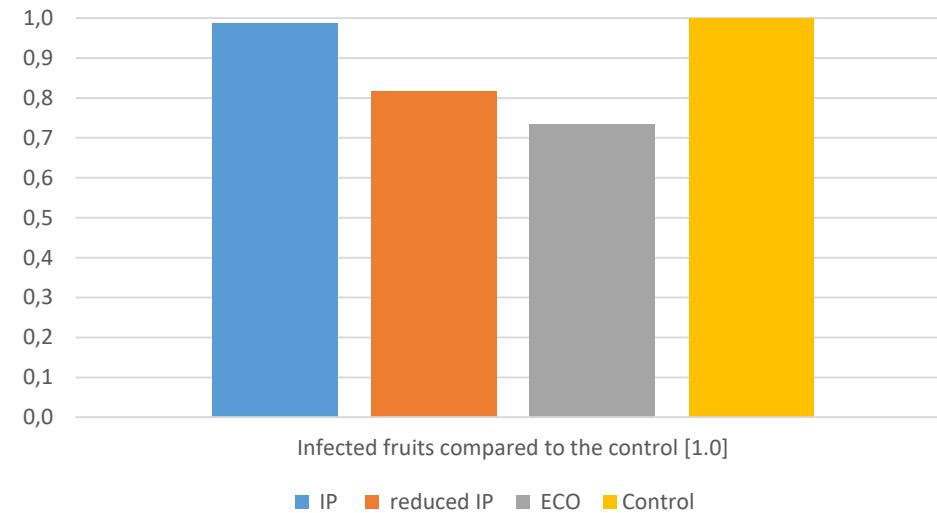
Percent of infected fruits of Markat strawberry cv.



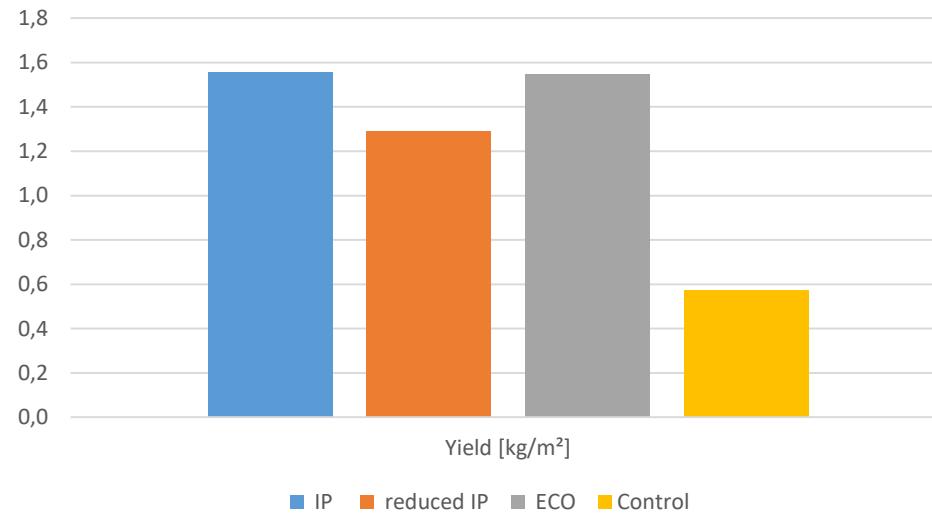
Florence strawberry cv. yield in tested protection systems



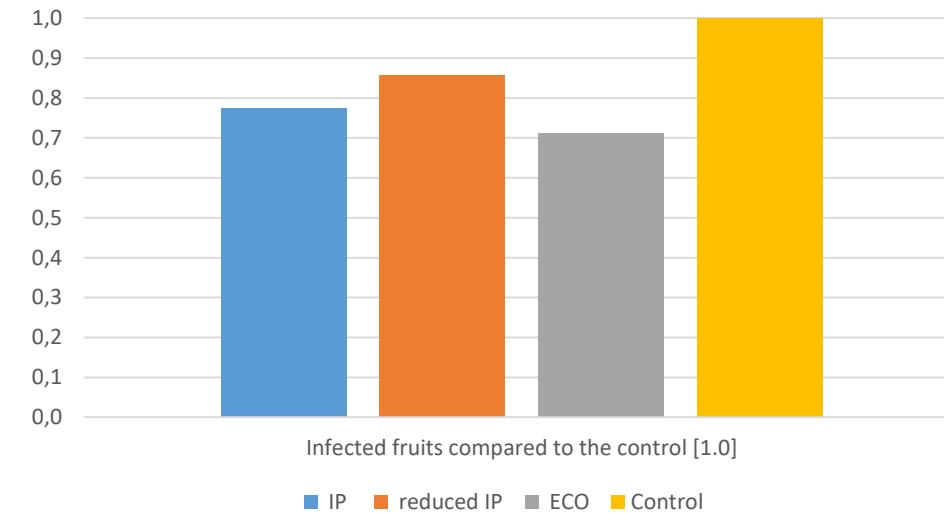
Percent of infected fruits of Florence strawberry cv.



Panvik strawberry cv. yield in tested protection systems



Percent of infected fruits of Panvik strawberry cv.



The same plant protection systems are tested in strawberry nurseries in WP 2 „Innovative non-chemical technologies for pest and disease-free transplant production of berry crops” - Task 2.4. „Use of environmentally friendly products”



Red raspberry (5 cvs.): Polka, Poemat, Laszka, Ninni and Duo (control against: *M. rubi*, *P. rubi-idaei*, *P. macularis*)

Three systems of fruit production:

1. Integrated Protection (IP) - standard fungicides recommended in integrated production (Luna Sensation, Luna Experience, Scorpion)
2. Integrated Protection with the reduction of chemicals (reduced IP) - biological preparations with the support of IP fungicides in conditions of high disease pressure (Luna Sensation, Serenade, Limocide)
3. Biological Protection (ECO) - only biological preparations based on sulfur, essential oils and microorganisms (Limocide, Serenade, ZumSil)
4. Control (no protection)

Assessment:

- the degree of plant infestation by leaf diseases
- fruit yield and its quality



Raspberry protection against diseases in 2022

Tr. No.	IP		REDUCED IP		ECO	
	date	SUBSTANCES	date	SUBSTANCES	date	SUBSTANCES
1	19.05	azoksystrobina + difenokonazol	19.05	orange oil	19.05	orange oil
2	6.06	fluopyram + tebukonazol	31.05	orange oil	31.05	orange oil
3	6.29	fluopyram + trifloksystrobina	6.06	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>	6.06	<i>Glomus, Rhizophagus, Bacillus, Streptomyces spp., Trichoderma, Pichia</i>
4	3.08	ciprodinil+ fludioksonil	6.06	fluopyram + tebukonazol	6.06	<i>Pythium oligandrum</i>
5			29.06	fluopyram + trifloksystrobina	10.06	<i>Bacillus subtilis</i>
6			3.08	<i>Pythium oligandrum</i>	29.06	<i>Pythium oligandrum</i>
7					3.08	<i>Pythium oligandrum</i>

**The project is implemented under
the Norwegian Financial
Mechanism for 2014-2020
„Working together for a green,
competitive and inclusive Europe”.**

Projekt jest realizowany w ramach
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lata 2014-2020 „Wspólnie działamy na rzecz
Europy zielonej, konkurencyjnej
i sprzyjającej integracji społecznej”.

**THANK YOU
FOR ATTENTION!**

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