EFFECT OF COMMERCIAL PESTICIDE FORMULATIONS ON GROWTH OF MYCELIUM AND FORMATION OF OOSPORES OF *PHYTOPHTHORA INFESTANS IN VITRO*

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Introduction

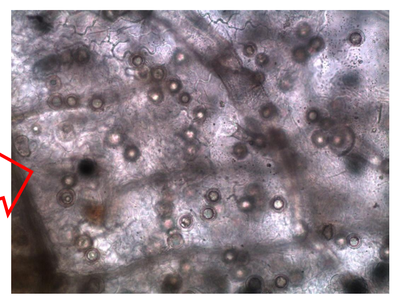
Phytophthora infestans (Mont.) de Bary – the causal agent of late blight, devastating disease of potato and tomato worldwide. Contact of strains of two different mating types is necessary for the formation of thick-walled sexual spores called oospores.

Oospores can survive between the growing seasons and cause the early infections in potato fields. Hybrid oospores increase the genotypic diversity of population.

The occurrence of oospores in blighted leaves in the field

Blighted leaves were collected in the commercial potato field from cultivars Skarb, Yanka, Ragneda not treated with pesticides during 30 days before collecting. Immediately after sampling leaves were frozen at –18°C and kept up to testing in the freezer. Before microscopic examination leaves were defrosted and fade its tissue.

Potato cultivar	Late blight development (%)	Number of tested samples (leaves)	Number of samples with oospores
Skarb	100	60	6
Yanka	80	30	1
Ragneda	5	30	1



Abundant oospores were found in the leaf of cultivar Yanka.

Effect of pesticides on growth of mycelium and formation of oospores

It is known that active against late blight fungicides reduce the formation and viability of *P. infestans* oospores *in vivo* and *in vitro* (Kessel et al., 2002, Hanson, Shattock, 1998). We tested commercial pesticide compositions not registered against late blight.

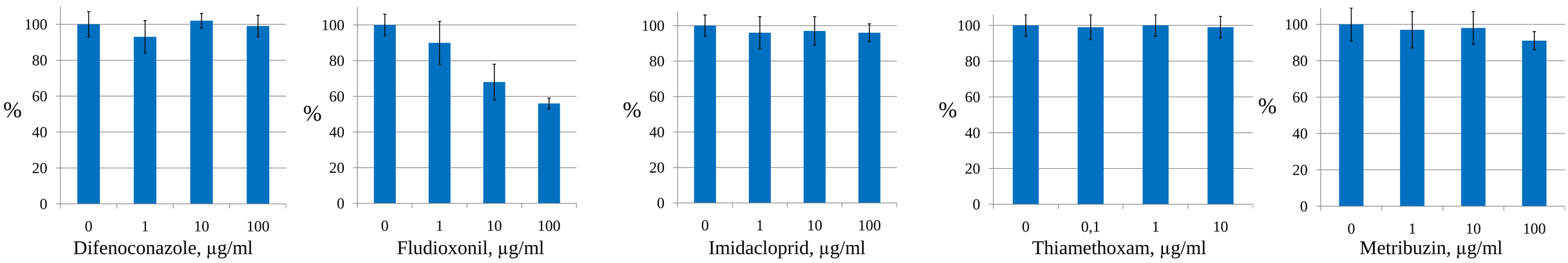
Pesticide	Type of the pesticide	Name of the tested commercial pesticide formulation	Allowed concentration of pesticide (a.i.) in sprayed water, µg/ml
Difenoconazole	Fungicide	Skor	188-625
Fludioxonil	Fungicide	Maxim	1000
Thiamethoxam	Insecticide	Aktara	37-75
Imidacloprid	Insecticide	Tanrek	50-100
Metribuzin	Herbicide	Zenkor	1630-4900

Isolates collected in 2012 from non-treated with pesticides plots in Moscow and Ryazan regions were used for the experiments. Agar disks from actively growing cultures of single isolates were plated on nonamended and fungicide-amended oat-meal agar. Petri dishes were wrapped with parafilm and incubated at +18 °C for 21 days. Three replicate of dishes at each concentration were used.

After incubation all media from the plate was resuspended in 30 ml of water. Three probes (3x30 µl) were taken from each Petri dish suspension, oospores in 60 fields of view (3x20) were quantified. Concentration of the oospores was recalculated for 1 mm^3 of agar.

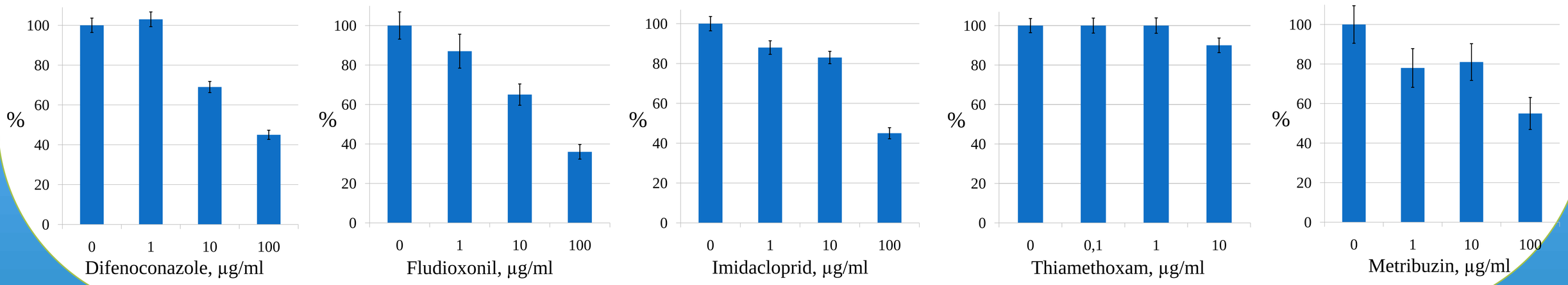
Radial growth of a mycelium on the oat-meal agar with pesticide

(per cent of control, 12 days of incubation)



Oospores concentration in the oat-meal agar with pesticide

(per cent of control, 21 days of incubation)



Conclusions

1. Oospores were found in blighted potato leaves in the field.
2. Fludioxonil inhibited the radial growth of the colony of *P. infestans* and formation of oospores.
3. Difenoconazole, imidacloprid, metribuzin did not influence on the radial growth of the colony, but inhibited the formation of oospores.
4. Thiamethoxam did not influence neither on the radial growth of the colony, nor on the formation of oospores.