

USABILITY OF A CELLULOSE BASE BINDING MATERIAL IN CONTROL OF WCR (*DIABROTICA VIRGIFERA VIRGIFERA* LECONTE, 1868)

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Introduction

Cellulose pearl was tested for years in our laboratory. Insecticide binding ability, retard of the action of bioactive agents, usability against the Western Corn Rootworm (KYSAN és MILLER, 1986) and other early stage pests (e.g.: Corn Weevil *Tanymecus dilaticollis* Gillenhal/) was investigated. Our aim was to the pearl being able to bind water-base pesticides on its porous build and could be able to emit these agents under vegetation continuously. It could be useful to reduce the amount of soil insecticides and the soil pollution by pesticides. With soil pesticides get many active chemical agents in the fields and the plants. Plant protection experts have the duty to reduce the risk of environmental pollution, which are caused by using of insecticides and fertilizers. We have to find new methods to protect our crops because of conservation.

Greenhouse screenings and field experiments were started to investigate all the favourable abilities of the pearl.

Methods

Screening

In 2005 greenhouse screenings were done with *Tanymecus* test objects. Mortality of insects and leaf area losses were measured under the experiment. 60 cm long balcony pots (60x12x15 cm) were used for testing efficacy of the retard insecticides. Moisture soil was spread to the potteries in 6-7 cm layer. 1 cm deep tray was made in the soil and pearls were sown into it 3 cm far from each other. 2 cm layer of moisture sand was laid onto the pearls and maize kernels were sown into it. 3 weevils were used in each treatment for testing the agents in isolator cages. Mortality was examined on every 3 days after the treatments. Death rate of insects was expressed by Abbott's-formula (Fig. 1.). Our results were tested in field experiments too.

$$\text{Corrected \%} = \left(1 - \frac{\underline{n} \text{ in T after treating}}{\underline{n} \text{ in C after treating}}\right) * 100$$

Figure 1.: Abbott's-formula; T-treated, C- control

Measuring of leaf area losses

Leaf losses under greenhouse screening were processed digitally with the software Adobe Photoshop CS. Leaves were digitalized by HpScanJet 4060 type vertical scanner. Median filter tool was used for eliminating dot-like picture noises. Using threshold function black dots were separated from the whites. Amount of black leaf-dots were measured by histogram on 200 dpi digital pictures. Chewed leaves were corrected by black pen tool and measured again. Difference of chewed and corrected leaf surfaces was expressed in percents.

Results and discussion

Screening

Mavicell was tested directly, half year after and one year after treatment. In 2005 pearls were researched after a long stock-period. After one year storing period the results were much diverse. The retard effect was extended with oily attached agents like acetamipride (Mospilan 70 WP). Imidachlopride and other non oily agents lost their effect after long term storing.

Table 1.: Number of death weevils and values of mortality
(19 05 2005-18 05 2005)

Treatments	L	D	L	D	L	D				
Repetitions	12.05.2005		15.05.2005		18.05.2005		Ave.	Efficacy [%] (Abbott)		
Acetamipride	2	1	1	1	0	1	0	0	50	100
Cabofuran	2	1	1	1	0	1	0	0	50	100
Imidacholpride	3	0	3	0	3	0	1,3333	-132,3	1	33,33
Bifentrine	3	0	0	3	0	0	0	-50	100	100
σ	3	0	2	1	2	0	2	-	-	-

L-Live; D-Death; Ave-Average value

Negative Abbott-values caused by the natural mortality in untreated pots. Data of mortality were compared and corrected with the results of leaf consumption.

Measuring of leaf losses

When leaf losses were higher than 5-10 % (Fig. 2-3.) results of mortality experiments need to be corrected.

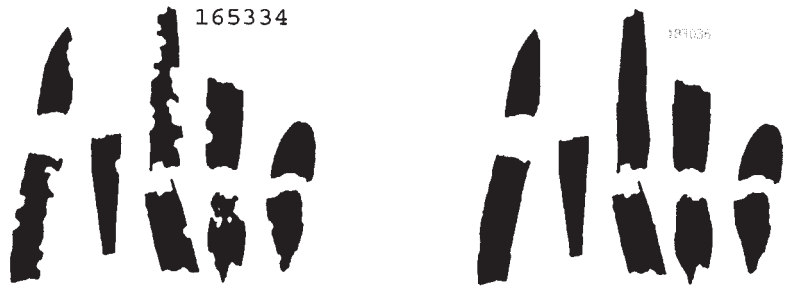


Figure 2.-3.: Digitally processed photos of an imidachlopride treatment with number of black points
[200 dpi]

Efficacy of Mavicell could be corrected with percents of leaf loss. Therefore it is so important to know how many leaf loss causes mortality in weevil population.

Field experiments

Field researches were done for years on small and large plots with insecticide treated Mavicell. Our aims were to test usability of Mavicell and usability sowing of pearls. Only Kuhn seeding machine family is able to sow Mavicell pearls by their cell system granule adapter. Other machines with helical adapters are unable to sow the binding material.

Results of the trials were good but convincingly not good enough to use the retardant agent in the wide cropping. On the base of IOWA measuring (DYK, 2001) it is clearly seen that Mavicell is not able to elongate the effective period of pesticides enough. IOWA values of Mavicell were not significantly lower than in other treatments (Fig. 4.) (TAKÁCS et al., 2004). The only positive effect of the pearl was that it was able to reduce the price of insecticide soil treatments.

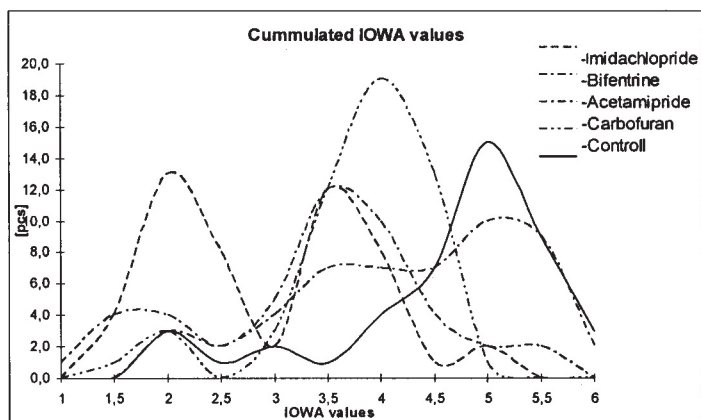


Figure 4.: Cumulated values of field experiments, 2004

Small amount of water was used for dissolve the insecticides. Mavicell has an extremely large relative absorption surface but only a small amount of insecticide was absorbed on the upper layer of the pearl. Mavicell is functioning almost like a simple superficial carrier with low retardant effect.

Conclusions

Mavicell has had ability to elongate the efficacy period of pesticides as the same as disinfectant microcapsules (e.g. carbofuran or teflutrine agents). The only advantage of the pearl was to reduce costs of disinfection (TAKÁCS et al., 2005). If insecticides can be absorbed on inner parts of the pearl, effective period of agents could be extended. Unfortunately it is not fit to use in every seeding machines and since producing of Mavicell had stopped there is no reason to continue the usability of it. Our suggestion was that we had to find other retardant agents to use against WCR (e.g. perlite, ureaform, etc.)

Acknowledgement

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