

CORN APPETIBILITY REDUCTION IN WILD BOAR (*SUS SCROFA* L.) IN RELATIONSHIP TO THE USE OF COMMERCIAL REPELLENTS

DIMINUZIONE DELL'APPETIBILITÀ PER IL CINGHIALE (*SUS SCROFA* L.) DEL MAIS TRATTATO CON TRE REPELLENTI COMMERCIALI

FRANCESCO SANTILLI ⁽¹⁾, LORENZO GALARDI ⁽²⁾, CLAUDIA RUSSO ⁽³⁾

SUMMARY

The aim of this pilot trial was to compare the effectiveness of three commercial repellents in decreasing corn intake by captive wild boar and if it should be a strategy to reduce wild boar damage to seeded corn.

Three adult wild boars were simultaneously offered untreated corn (control) and corn treated with one of the following repellents: - Morkit[®], an anthraquinone based repellent used to control bird damage on sprouting cereals; - Tree guard[®] a denatonim benzoate repellent used to protect trees by deer browsing; - Hot Sauce[®] a capsaicine based repellent.

Five tests were carried out, each lasting 6-7 days and 3-7 days apart from each other.

Results showed that: Hot sauce failed to reduce corn consumption when added at 10 g/kg of corn, but when added at 25 g/kg reduced daily consumption by 80.5%; Morkit (5 g/kg) reduced daily consumption by 86.5%. Tree guard (sold ready to use) reduced consumption by 86.5%. In the last test, with only treated corn offered to the animals, Morkit and Hot Sauce - treated corn were consumed less than Tree Guard - treated corn (40% and 41% respectively).

Use of repellents to reduce damage immediately after the sowing can be evaluated in presence of abundant alternative food.

Key words: repellent; wild boar; *Sus scrofa*; corn.

RIASSUNTO

Scopo della presente prova preliminare è stato valutare la possibilità di ridurre i danni da cinghiale nei campi di mais al momento delle semine.

Per le prove sono stati impiegati tre cinghiali adulti alimentati con mais trattato con diversi tipi di repellenti e con mais non trattato come controllo. I repellenti testati sono stati: - Morkit[®], un repellente a base di antraquinone, solitamente usato per ridurre i danni da uccelli nei campi seminati; - Tree guard[®], un repellente a base di denatonio-benzoato, usato per proteggere la corteccia degli alberi dai cervi; - Hot Sauce[®], un repellente a base di estratto di peperoncino (capsaicina). Sono state condotte 5 prove della durata di 6-7 gg. ciascuna inter-

⁽¹⁾ Dottorando in Produzioni Animali, Sanità ed Igiene degli Alimenti nei Paesi a Clima Mediterraneo, Anno 2003.

⁽²⁾ Agenzia Regionale Sviluppo Innovazione Settore Agricolo e Forestale (ARSIA), Firenze.

⁽³⁾ Dipartimento di Produzioni Animali, Direttore Prof. Paolo Verità.

vallate di 3-7 gg. l'una dall'altra. I risultati hanno mostrato che: - l'Hot sauce non induce alcuna riduzione di consumo rispetto al controllo quando viene impiegato alla dose di 10 g/kg mentre risulta efficace alla dose di 25 g/kg (riduzione media di consumo dell'80,5% rispetto al controllo), - il Morkit (5 g/kg) ed il Tree guard (venduto in forma liquida pronto all'uso) inducono una riduzione media di consumo rispetto al controllo dell'86,5%.

Nell'ultimo test, in assenza di mais non trattato a disposizione degli animali, il Morkit e l'Hot Sauce hanno indotto una riduzione di consumo rispetto al Tree Guard rispettivamente del 40% e del 41%.

Parole chiave: repellenti; cinghiale; *Sus scrofa*; mais.

INTRODUCTION

In many countries Wild boar (*Sus scrofa* L.) is the specie which cause most crop damage.

Corn appears as one of the preferred crops (Fournier-Chambrillon et al., 1994).

Even if the main damage can be observed during the cereal maturation (between the milk and the wax phase of the plants), damage occur also during the sowing phase which oblige the farmers to repeat the sowing. Consequently, in the areas where wild boar occur, corn fields are protected by electrified fences during the whole cycle of the plants. However the maintenance of this equipment for prolonged periods (5-6 months) results often expensive.

For these reasons we carried out a preliminary trial to evaluate the possibility to reduce the attractiveness of the sown corn by treating it with commercial repellents.

Products which act on taste were preferred to products which act on smell, since these last seems to have a scarce effect on the wild boar attractiveness of food (Brown et al., 2000).

The following repellents were used:

- Morkit[®] containing antraquinone at 80% concentration.

Antraquinone is well known for being a bird-repellent, and commonly used on seeds. It causes general malaise in the birds and induces the adversative conditioning to the treated food (Avery et al., 1997). Its action in mammalians is not known.

- Tree Guard[®], containing 0.2% w/w benzoate denatonium.

Denatoniumbenzoate, also called "Bitrex" is the most bitter known ingredient.

Bitrex can reduce rodents' damage to electric wires (Shumake et al., 1999; Shumake et al., 2000) and it is used for protecting seedling nurseries and individual trees from being browsed by rodents and deer. Its efficacy can vary (Nolte, 1998; Witmer et al., 1998; Wright & Milne, 1996) but it was found effective for reducing fallow deer damage to young olive trees (Santilli et al., 2004).

- Hot Sauce[®], containing capsaicine, the hot compound in capsicum. Capsaicine, is a general irritant. Successfully used to prevent deer browsing (Baker et al., 1999; Andelt et al., 1994; Wagner & Nolte, 2000).

MATERIALS AND METHODS

The trials were carried out between December, 2002 and January, 2003.

Three wild boar, 2 females and 1 male, coming from a farm, were transferred in an 11.000 sq. m enclosure.

The wild boar were fed *ad libitum* with control corn and with repellent - treated corn left on nylon sheets on the ground spaced few meters from each other. Five consecutive attractiveness tests were performed. Each test lasted 6-7 days and the tests were spaced 3-5 days each other. The daily consumption of each treated corn and of the no-treated corn, used as control, was measured in the first 4 test. The daily consumption of each treated corn without the presence of the no-treated corn, used as control, was measured in the last (5^o) test.

During the 1^o test Hot sauce was used to the dose of 10 g for kg of corn. In the following test Hot sauce was used to the dose of 25 g for kg of corn. The seed treatment was carried out by using an Hot sauce aqueous solution (100 ml for kg of corn).

Tree Guard was used to the dose of 100 ml for kg of corn (Tree Guard is sold liquid, ready to use).

Morkit was used to the dose of 8 g for kg of corn. Analogously to Hot Sauce, the seed treatment was effected by using an aqueous solution of 100 ml for kg of corn.

Corn consumption was daily measured and the place of the nylon sheets was randomly changed to avoid the possible influence of the position.

Daily consumption measured during of the first 4 tests was analysed by two way ANOVA (time and treatment, both analysed as categorical variables); Bonferroni multiple test was used to compare all means. Daily consumption measured during of the 3^o, 4^o and 5^o test was analysed with the same model. Overall corn daily consumption was analysed by one way ANOVA (SAS, 2002).

RESULTS

The low consumption of corn observed initially (Tab. I) was probably due to the fact that in the enclosure there was a certain availability of natural food such as acorns and chestnuts.

After the first few days, the only available food was the test food.

As in the first part of the trial the Hot Sauce treated corn (10 g/kg) was consumed more than control corn, the concentration of Hot Sauce was increased to 25 g per kg of corn.

Throughout the whole period Tree Guard, Morkit and Hot Sauce treated corn were consumed less than control corn (Tab. I and Fig. 1).

In the last period of the trial (7 days) carried out without control corn, Tree Guard treated corn was consumed 40% more than the other two repellent treated corn (Tab. II).

Tab. I. Avg. Daily consumption with no treated corn as control. *Consumo medio giornaliero di mais trattato con i diversi repellenti in presenza di mais non trattato di controllo.*

	R ² Adj = 0.74; n = 60; R.M.S.E. = 569.02	Corns with repellent				Total consumption Avg.± st.err.
		Control Corn (no treated)	Morkit [®]	Tree guard [®]	Hot sauce [®]	
1° test	g	256 bc	0 c	100 bc	444 bc	800±601.03 d
2° test	g	1000 b	95 bc	105 bc	125 bc	1325±694.01 d
3° test	g	3000 a	195 bc	205 bc	720 bc	4120±694.01 e
4° test	g	2560 a	630 bc	510 bc	440 bc	4140±537.58 e

Means with different letters statistically differ per p<0.05.

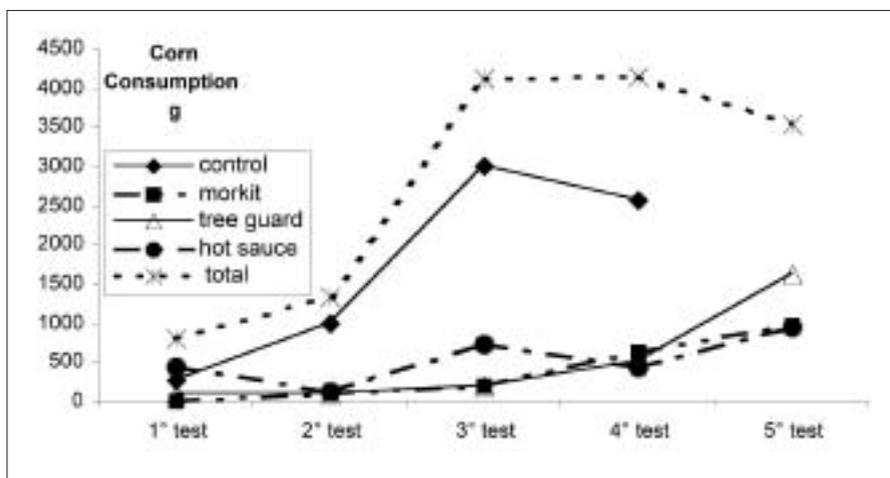


Fig. 1. Corn consumed during the tests. *Andamento del consumo di mais durante i test.*

DISCUSSION

All three repellents reduced the daily food ingestion in comparison with the non-treated corn.

Corn consumption of treated corn was reduced more when an alternative food (untreated corn) was available.

The present study thus confirmed that repellents could be employed for limiting the wild boar damage to the cultivation immediately after the sowing in presence of

Tab. II. Avg. daily consumption with and without no treated corn as control. *Consumo medio giornaliero in presenza o assenza di mais non trattato di controllo.*

R ² Adj = 0.41; Sum Wgts = 36; Root Mean Square Error 564.26		Corns with repellent			Total consumption	
		Morkit [®]	Tree guard [™]	Hot sauce [®]	Avg. ± st.err.	
With no treated corn (3° test)	g	195 b	205 b	720 b	4120±694.01	ns
With no treated corn (4° test)	g	630 b	510 b	440 b	4140±537.58	ns
Without no treated corn (5° test)	g	963 ab	1615 a	955 ab	3533±601.03	ns

Means with different letters statistically differ per p<0.05

abundant alternative food eventually provided by dissuasive feeding (Vassant, 1997).

In this way might be possible to limit the use of the electrified fences to the maturation period of the crop, so to reduce maintenance costs.

As wild boar damage can also occur during the germination phase, the effectiveness of these repellents should also be tested on this phase.

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