BAS 263 .. I, common name Cloethocarb, a novel type carbamate insecticide/nematicide for flea beetle (Phyllotreta spp., Psylliodes chrysocephala) control in oilseed rape

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Introduction

BASF's new carbamate insecticide/nematicide, BAS 263 .. I (common name Cloethocarb), was first made public by Harries and others (1980). Further informations on chemical and biological aspects have been presented by Kiehs and others (1982). After having shown in North America consistently high levels of corn rootworm control, under variable conditions of maize (field corn) growing, BAS 263.. I will be introduced in 1983 under Experimental Use Permit with the trademark LANCE.

For the control of flea beetles on oilseed rape, first field work has been initiated since 1980 (Canada) and 1981 (France) respectively.

Material and Methods

BAS 263 .. I was applied primarily formulated as 5 G and 10 G (1980). The standard insecticides used for comparison included granular carbamates and a seed treatment.

The preliminary trial results presented, originate from field trials conducted with 9 (Canada) or 4 (France) replicates and conventional randomized layouts. In Canada, the insecticide was applied with the seed, through the drill box of a commercial disc drill. The application equipment used in France consisted of units which are common for granular row treatments.

To assess the effectiveness of the treatments to summer rape (Canada), ten field -collected flea beetles were placed in each of 5 cages over seedlings in 2 replicates of the treatments, at different intervals after seeding. The number of dead beetles was recorded 72 h after the exposure. An emergence cage covering 0,9 m^2 of soil was placed in each plot middle of July in order to collect emerging adults of the summer generation, as indication for the influence of the different treatments on the number of larvae developing on the roots (3,4). In the trials conducted in winter rape (France) besides the short term effect on flea beetle attack and plant density, the long term influence on the number of flea beetles was evaluated.

Results and discussion

On various annual field crops, flea beetles (Subfam. Halticinae, Fam. Chrysomelidae) of different genera — besides Phyllotreta and Psylliodes such as Epitrix, Chaetocnema, Systena, Haltica and Disonycha - are frequent pests, damaging the host plants mainly by "shot-hole" feeding on cotyledons and leaves. Most flea beetles are summer breeding with only one generation per year. Under these conditions - valid for Phyllotreta-species attacking summer rape - the seedlings have to be protected basically for a 4-6 weeks period. Later damage generally can be tolerated, because the plant is able to outgrow any subsequent injury to a high degree.

The cabbage stem flea beetle (Ps. chrysocephala), however, is one of the few winter breeding species, overwintering mainly as larval stage. Quite different is therefore the basic situation for flea beetle control on winter oilseed rape in Western Europe, namely France: Due to the appearance of both adults and larvae in fall, leaves and stems have to be protected for several months, so that a large period of flea beetle control is needed.

Systemically acting insecticides applied as seed or soil treatment have become a promising tool for modern crop management. Whereas seed treatments, generally, provide only a short period of protection, granular in-furrow or band treatments cover a longer period , so that no more protection against flea beetles should be needed.

Comparing over a 3 years period (1980-82) the different treatments with regard to the control of Crucifer flea beetle on summer rape (Canada) in terms of adult mortality, the figures show the following: At the early evaluation, about 10 days after seeding, the most consistent effects gave the seed treatment (99 %), followed by BAS 263 .. I and Aldicarb (95 %) and Carbofuran (87 %), fig. 1; all treatments refer to application rates of 0.28 kg a.i./ha.

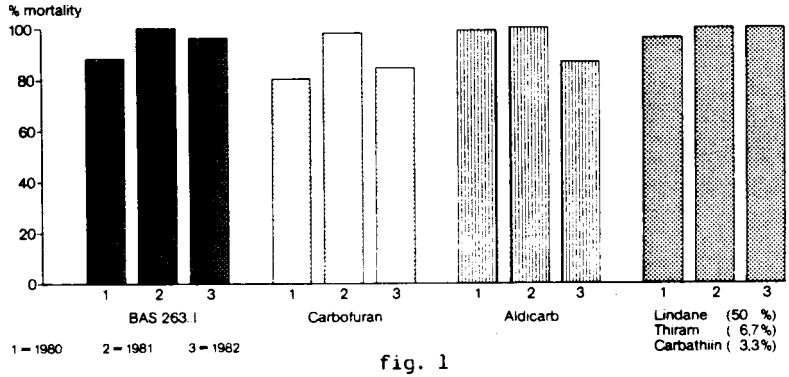

fig. 1

At the later timing of evaluation, about 20 days after seeding, the situation has drastically changed: The seed treatment dropped to 6 % mortality - confirming the short period of protection achieved by the seed treatment - whereas the granular insecticides remained with more than 50 % effectiveness. At this evaluation BAS 263 .. I obtained an average level of control (68 %) comparable to Aldicarb (61 %), fig. 2

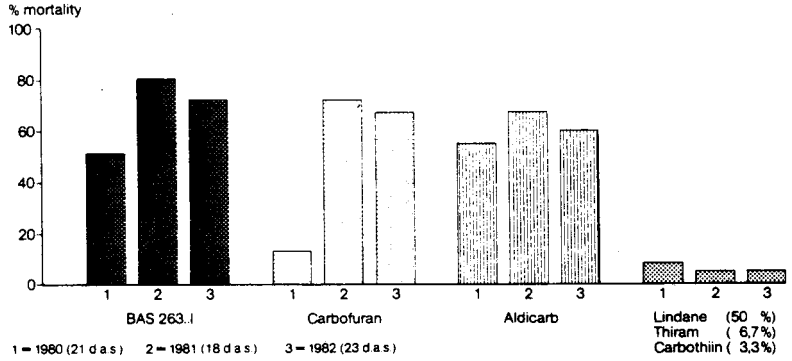

fig. 2

Comparing the seed yields of the same treatments during the period 1980-82 it is obvious, that they are reflecting to a high degree the evaluation of caged flea beetles as index for the biological activity of the treatments (fig. 3).

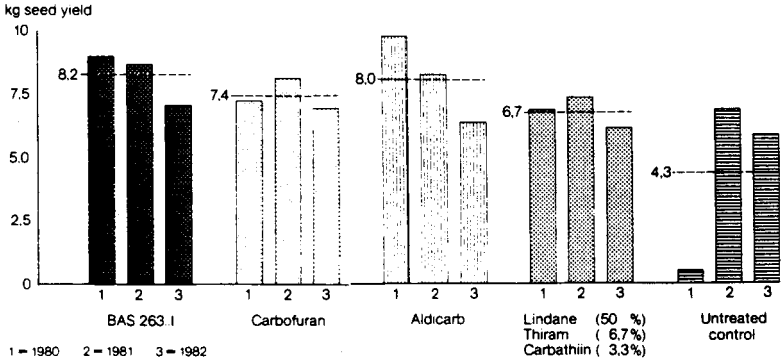

fig. 3

Similar correlations can be observed between seedling damage, number of emerged adults from the treated plots, and number of pods on the main raceme, as shown from 1980 trial data (fig. 4).

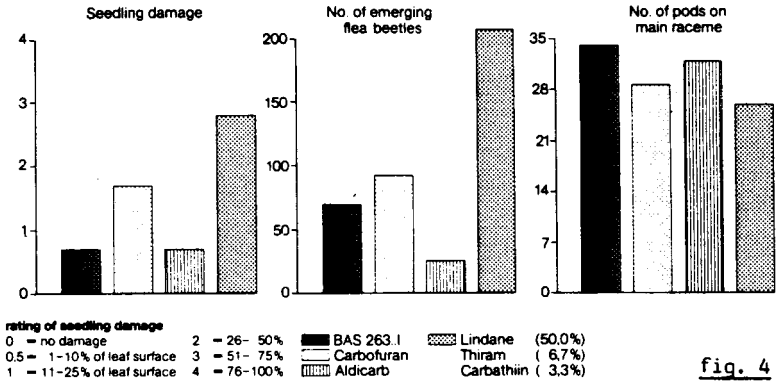

fig. 4

Considering that soil applied insecticides show quite different physical properties with regard to their water solubility, the variation of soil humidity - as well as of temperature and distribution of granules - is involved to a high degree in the field performance of these materials (fig. 5).

Common name	Trade name	Water solubility (ppm)
Chlorpyrifos	Dursban/Lorsban	2
Lindan	Lindan	10
Terbufos	Counter	15
Isofenfos	Oftanol/Amaze	24
Bendiocarb	Ficam	40
Thimet	Phorate	50
Chlormephos	Dotan	60
Fenamiphos	Nemacur	700
Carbofuran	Furan/Curaterr	700
Ethoprop	Mocap	750
Cloethocarb	Lance	1.700
Thiofanox	Dacamox	5.200
Aldicarb	Temik	6.000
Aldoxycarb	Standak	9.000

fig. 5

The comparative effectiveness of granular soil insecticides for flea beetle (Ps. chrysocephala) control in winter rape is - due to the prolonged period of attack - widely influenced by factors such as precipitation and temperature, timing of the adult invasion on the crop in fall, egg development and subsequent attack of the plants by larvae. During the first month after treatment, until October, BAS 263 .. I exhibited in France an effect, equal or superior to the standard treatments (fig. 6).

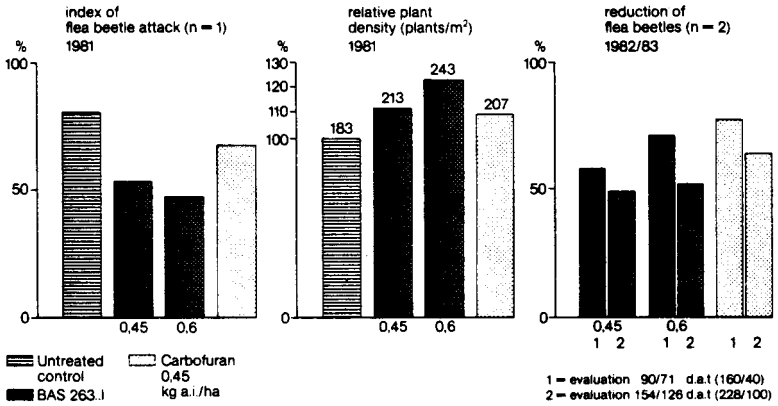

fig. 6

Considering the long term control of the cabbage stem flea beetle on winter rape it is concluded from preliminary field data, that BAS 263 .. I, applied at 0,5-0,6 kg a.i./ha can give an adequate suppression of flea beetle populations. However, further work is needed over a several years period, in order to determine the optimum rate. In all field trials which have been conducted so far, BAS 263 .. I has shown a consistently good crop tolerance at the used rates.

Summary

In 1980 a first paper (1) has been presented, dealing with the biological properties of BAS 263 .. I (Cloethocarb), a systemically acting new insecticide and nematicide with a broad spectrum of efficacy.
Besides maize, other crops such as potatoes and cereals, have been investigated with regard to the insecticidal and nematicidal properties of BAS 263 .. I, confirming the highly versatile caracter of the product.

Since 1980, BAS 263 .. I has shown in Western Canada an outstanding performance for the control of flea beetles on oilseed rape. Applied as 5 G or 10 G at 0,28 kg a.i./ha with the seed, the product gave a uniform, high level of flea beetle control, combined with an excellent crop tolerance.

First field trials conducted in France in winter rape (1981/82 and 1982/83) at rates of 0,45 and 0,6 kg a.i./ha indicated that BAS 263 .. I may be successfully used in oilseed rape also under the growing conditions of Western Europe.

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