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FINAL REPORT

“INSECT AND OTHER PESTS OF CANOLA” (2011)

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CONTENTS:

Abstract/Samevatting

1. Introduction
2. Trial to determine whether burning of stubble prior to planting is beneficial in pest control and why this should be so?
3. Seasonal activity peaks of the three exotic slug species
4. Distribution and population ratios of slug species on different farms and within different crops in the Overberg district
5. Outbreak of dune (*Theba pisana*) and tower (*Cochlicella barbara*) snails in the southern Overberg
6. Insect pests of canola
7. Discussion
8. References
9. Acknowledgements
10. Farmer's Days and field visits

ABSTRACT

The objective of the 2011 trials was to confirm the results obtained from previous trials and to determine how the burning of stubble prior to planting lowers the losses of canola seedlings caused by isopods. At the same time it was intended to evaluate the opposing management practices – the burning of stubble compared with that of killing all weeds with herbicide, which in the absence of slug pellets results in severe losses of seedlings. Unfortunately the rains were late and there were no weeds and so the herbicide treatment could not be carried out. The 2011 season coincided with an outbreak of slugs and a large decrease in the numbers of isopods. Yet the analysis of the data indicated that isopods still played the major role in the losses that did occur. Despite the high number of slugs, those fields treated with slug pellets at planting resulted in a bumper crop.

Those plots which were not treated with herbicide as originally planned were incorporated as additional replicates into existing treatments e.g. 'burn + herbicide' was included in the 'burn' only treatment. Thus four treatments were analysed: control, slug pellets, burn, and burn + slug pellets. The mean number of isopods recorded over the entire season in the 'control' was significantly higher than in the other three treatments which did not differ significantly from each other. In contrast, the analysis of the mean number of slugs for the crucial first six weeks during which the slug pellets were effective showed no significant difference in numbers between treatments. Over the same first six week period, the mean number of isopods in the 'control' treatment were significantly higher than in the other treatments except that of 'burn' only. Thus there was a correlation between high numbers of isopods and low survival rate of seedlings but not so with the slugs which were more uniformly distributed between treatments. The greatest survival of seedlings occurred in the

'burn + slug pellet' treatment and the lowest in the 'control', thus the hidden effect of the isopods can be seen.

Over the entire season the mean number of slugs was highest in the treatments 'burn + slug pellets' and 'slug pellets' alone. This appears to contradict the known efficacy of the slug pellet formulations, but it must be remembered that the slug pellets were only effective during the first six weeks when only 4% of the total slug population recorded throughout the season was present. Thus most slugs do not come into contact with the slug pellets, and migrate from bare areas into adjacent healthy plots where the slug pellets had earlier eliminated the isopods.

The three slug species appeared within the main trial in the ratio of *Deroceras panormitanum* (70.8%), *Milax gagates* (16.0%) and *Deroceras reticulatum* (13.2%). The dominance of *D. panormitanum* in canola fields was largely a consequence of the large numbers hatching from eggs in the last weeks before windrowing. In additional traps placed in fields of lupins, wheat and canola, *M. gagates* predominated, although a higher frequency of *D. panormitanum* was also found in lupins. No linkages could be found with *D. reticulatum* to rotation crops or different fields and their ecology remains an enigma.

Not only were conditions ideal for slugs but also for other molluscs, where there was an outbreak of the dune (*Theba pisana*) and tower (*Cochlicella barbara*) snails in canola and vines in the southern Overberg which appeared on the plants just prior to windrowing.

The activities of the insect pests of canola were severely depressed resulting in negligible damage this season.

Samevatting

Die doelwit van die 2011 proewe was om die resultate van die vorige proewe te bevestig en om te bepaal hoe die brand van stoppel voor aanplanting, die verliese aan canola saailinge, as gevolg van isopodes, verlaag. Ter selfde tyd was die intensie om die verskillende beheer praktyke – die brand van stoppel, te vergelyk met die spuit van onkruid met onkruidodder, wat tot erge verlies van saailinge gelei het, in die afwesigheid van slakpille. Ongelukkig was die reën laat en daar was nie onkruid om die onkruidodder behandeling uit te voer nie. Die 2011 seisoen het saam geval met die uitbreek van slakke en 'n groot vermindering van isopodes. Tog het die analisering van die data aangedui dat die isopodes steeds 'n groot rol gespeel het met die verlies van saailinge wat wel voorgekom het. Ten spyte van die groot aantal slakke, het die plote wat behandel was met slakpille tydens aanplanting 'n besonderse groot oes gehad.

Die plote wat nie met onkruidodder behandel is, soos oorspronklik beplan nie, was as addisionele herhalings gebruik vir bestaande behandelings bv. 'brand + onkruidodder' was ingesluit by die 'slegs brand' behandeling. Dus was daar vier behandelings wat geanaliseer is: kontrole, slakpille, brand en brand + slakpille. Die gemiddelde aantal isopodes aangeteken gedurende die hele seisoen in die 'kontrole' was betekenisvol hoër, as in die ander drie behandlings, wat nie betekenisvol van mekaar verskil het nie. In kontras daarmee, het die analisering van die gemiddelde aantal slake gedurende die kritieke eerste ses weke, wanneer die slakpille aktief is, geen betekenisvolle verskil getoon nie. Gedurende dieselfde eerste ses weke, was die gemiddelde aantal isopodes in die 'kontrole' behandeling betekenisvol hoër as in die ander behandelings, behalwe die van 'slegs brand'. Daar was 'n korrelasie tussen die hoë aantal isopodes en lae oorlewing van die saailinge, in teenstelling met die van die

slake wat meer eweredig tussen die behandelings versprei was. Die grootste oorlewing van saailinge was in die 'brand + slakpille' behandeling, en die laagste oorlewing in die 'kontrole', dus kan die versteekte effek van die isopodes waargeneem word.

Die gemiddelde aantal slakke was die hoogste in die 'brand + slakpille' en 'slegs slakpille' behandelings, gedurende die hele seisoen. Dit lyk dus of die resultate die erkende effektiwiteit van slakpille weerspreek, maar dit moet ingedagte gehou word dat die slakpille slegs effektief was die eerste ses weke toe slegs 4% van die totale slakpopulasie, wat gedurende die seisoen aangeteken is, teenwoordig was. Dus kom die meeste slakke nie in kontak met die slakpille nie, maar migreer vanaf die oop areas na die aangrensende gesonde plote, waar die slakpille die isopodes uitgeskakel het.

Die drie slakspesies het in die hoofproef in die volgende verhoudings voorgekom: *Deroceras panormitanum* (70.8%), *Milax gagates* (16.0%) en *Deroceras reticulatum* (13.2%). Die dominasie van *D. panormitanum* in die canola landerye kan grootliks toegeskryf word aan die groot aantal slakkies wat uit eiers uitgebroei het gedurende die laaste paar weke voor die plante platgesny was. Onder addisionele valle wat in lupiene, koring en canola landerye geplaas was, het *M. gagates* gedomineer, alhoewel 'n hoër frekwensie van *D. panormitanum* ook in lupiene gevind was. Geen verband kon gevind word met *D. reticulatum* op rotasie gewasse of verskillende landerye nie – hulle ekologie bly 'n enigma.

Toestande was egter nie net gunstig vir die naakslakke nie, maar ook vir ander slakke aangesien daar ook 'n uitbraak van die duineslak (*Theba pisana*) en die toringslak (*Cochlicella barbara*) voorgekom het in canola en wingerde in die suidelike Overberg, wat op die plante verskyn het net voor die plante platgesny was.

Die aktiwiteite van die insekplae van canola was die afgelope seisoen baie onderdruk, wat dus min insekskade tot gevolg gehad het.

1. Introduction

The trials conducted in the 2010 season showed that the application of 8 kg/ha of slug pellets containing both 30g/kg metaldehyde + 20g/kg carbaryl broadcast on the surface at planting was the most cost effective method of protecting the seedlings from slugs and isopods during the crucial three week period after planting. In addition it was found that the burning of stubble as a method of weed control about a month before planting, as opposed to the complete elimination of weeds through herbicide sprays, resulted in a significantly higher survival rate of seedlings. The mode of action of the burning regime, whether as a direct effect on the organisms causing mortality or an indirect effect in removing cover or food, could not be ascertained from the trial. The main trial of 2011 was to determine whether the burning of stubble alone or in combination with other methods prior to planting was beneficial and what was the causal effect on isopods. Although the burning of stubble is not consistent with conservation farming, discovering how it is detrimental to isopods would provide an insight into possible alternate control measures or a way of reducing their population levels. Initial sampling of the two adjacent experimental plots of 2010 revealed that there were far fewer juvenile isopods in the burned plots as compared with that of the herbicide treated plots i.e. there appeared to be a direct affect causing mortality in juvenile isopods. In 2010 isopods caused almost all the losses in the control treatments, with slug emerging only later and in smaller numbers.