



Mondstuk van die canolawerkgroep

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CANOLA – Lessons learnt during the 2009 season

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Canola forms an integral part of the cropping systems research efforts at Langgewens Experimental Farm. The 2009 planting season proved to be a perilous one with a few hard lessons. Serious problems were experienced with the emergence of the canola which resulted in replanting several of the camps. In this communication we take a look at the possible causes of the problems.

Background

The following decisions were taken regarding canola during the annual planning meeting of the Langgewens technical committee held on 24 February 2009:

1. A conventional canola cultivar (44Y06) should be planted in the medic/ wheat/ medic/ canola system since herbicide resistant ryegrass is not a problem in that system implying that waiting for weeds to emerge after the first good autumn rains to allow for a pre-planting herbicide application to control early-season weeds would not be necessary. This further allows for early planting of canola in this system should soil moisture conditions be favorable for early planting.
2. A TT canola cultivar (Thunder) should be planted in the other systems to allow for the use of a triazine herbicide (Atrazine) as an alternative to allow for post-emergent herbicide control of grass and broad-leaf weeds in canola. To date the pre-emergent herbicide, Simazine, has been used in these systems. It was also decided that a pre-sowing broad spectrum herbicide should be used to control early-season weeds in these systems – implying a delay in planting after the first good rains.

Autumn rains were later than normally expected. Only 10 mm had fallen by late April which was insufficient to stimulate the germination of grass weeds. No rain fell in the first 10 days of May but good rains were forecast for the 13th May leading to a decision to plant all the canola camps in dry soil with the intention of using post-emergent herbicides to control weeds (Aramo in the 44Y06 and Atrazine in the Thunder). The canola camps were all sown on the 11th and 12th of May. Planting was followed by good rains from 14 to 17 May (>70mm). Weed seedlings (grass and broadleaf) that emerged following planting were sprayed on the 26th of May once the canola seedlings had produced their first permanent leaves and just before 30mm of rain fell on the 27th & 28th of May. The Atrazine was therefore applied in ideal conditions.

At about three weeks after planting the canola showed very poor seedling establishment in nearly all the camps planted to Thunder and in one of the two camps planted to 44Y06. Almost no seedlings were found in the 44Y06 camp while some of the camps planted to Thunder also had several bare patches with no canola seedlings. It was noted that the camps

with acceptable seedling establishment were located in the eastern part of the trial site that tends to have soils with lower clay content and higher gravel content than the central and western side of the trial site. Canola plant counts were done on the camps that had the worst establishment problems and showed less than 5 plants per square meter. During a detailed inspection of the canola camps poor germination, poor seedling vigor, “damping off” and insect and slug damage were recognized as potential factors that together could have resulted in the poor canola establishment. It was therefore decided to replant those camps that had less than 5 seedlings m⁻², excluding bare patches.

Discussion

Discussions on the possible causes for the poor germination and establishment boiled down to the following possibilities: poor seed viability, poor seedling vigor, soil-borne diseases, insect and slug damage and problems at planting. During the initial investigation regarding what could have caused the poor germination Mr S Laubscher indicated that he suspected that the planting of canola into dry soil could be a major cause, especially on the heavier soil types. He felt that the action of the AUSPLOW knife-point caused the heavier (high clay-content) dry soil to break into clods resulting in many of the canola seeds being planted deeper than was intended. During a detailed field investigation, where planting rows were opened using a small spade, it was difficult to find any seedlings and the ones that were found were often at a depth of more than 25mm.

Insect damage appeared to be the problem in the few seedlings found in the 44Y06 camp. In the camps planted to Thunder many of the seedlings found had died before the coleoptile had emerged from the soil surface. Most of these plants, and many of those that had emerged from the soil, appeared to be weak and diseased. It was therefore decided to collect samples of these seedlings to determine which diseases were present.

Inspection of one of the bare patches in camp 39/1 showed the presence of slugs. Slugs were subsequently also found in camp 42/1 that was planted to 44Y06. One of the other camps planted to Thunder that was not replanted also had large bare patches that might be attributed to slug or insect problems (slugs were not found in this camp but many of the canola seedlings that had emerged had been damaged by insects). These observations tend to indicate that slugs could have been one of the factors that resulted in poor seedling establishment in areas with high clay content since there was no problem with the 44Y06 planting in the camp where soils have a lower clay content.

The normal procedure before planting each season is to do germination tests on all the seed types that will be planted that season. Seed of the Thunder cultivar was obtained from the supplier and a portion of the consignment allocated to Tygerhoek and the remainder to Langgewens. Three separate seed germination tests conducted at Langgewens, using building sand as the soil medium, indicated a germination % of less than 35%. When germinated in a Petri-dish a germination % of 93% was observed. Given this germination % it was decided to use that seed source for planting the trial.

The 44Y06 seed had a germination % of 85% (tested under the same conditions as described above for the Thunder cultivar).

Following the observed poor germination, emergence and establishment of the canola it was decided to do additional germination tests on seed from the Thunder cultivar, under controlled conditions at Elsenburg. These germination tests were conducted in two different soil types (obtained from the camps that showed poor germination and establishment), and in sand). The results indicated an average germination (based on seedling emergence) of 76% at a depth of 25mm and 87% at 16mm. The 25mm depth was used to simulate a deeper planting. From these results it was clear that the poor germination, emergence and establishment could not be solely attributed to poor seed germinability but could also have been due to poor post-germination vigor. Seedlings with poor vigor would have been more susceptible to infection with soil-borne disease than vigorous seedlings. It is however clear that the 25mm depth showed a poorer potential for the seeds tested to emerge following germination. This is expected since the canola has a small seed and establishes best when planted in a well prepared seedbed at a depth of 16mm, as is normally recommended when planting with the DBS no-till planter.

Seedlings collected during the detailed investigation were taken to Dr S Lamprecht (ARC – PPI) for disease analysis. From the complex of isolated diseases it was clear that severe damping off of the canola played a huge part in the poor germination and establishment of the canola at Langgewens. The effect of planting in dry soil and seed placed deeper than planned has also contributed to the effect of the diseases.

Conclusions

With all these contributing factors taken into account the replanting of canola was undertaken to, as previously stated, ensure the integrity of the longterm crop rotation trials at Langgewens. It was deemed important to establish canola to ensure the positive effect thereof on the wheat that follows the canola during the next production season. Bravo TT (the only triazine resistant cultivar that was immediately available that had a high seed germination percentage as well high seedling vigor) was then used on those camps previously planted to Thunder and the cultivar 44Y06 on the single camp where it was previously planted. All camps requiring replanting were planted on the 10th of June into moist soil. The seeding rate was also increased by about 50% to ensure a good stand. All seed used for replanting was treated with Cruiser OSD to combat potential soil-borne diseases and insect damage. Slug pellets were applied and Cyperphos was sprayed directly after planting. The decision to replant was done, despite the late planting date, to keep the integrity of the long-term crop rotation trial. The camps showed excellent germination and establishment of canola seedlings after replanting. It was also decided that in coming seasons canola will only be planted in moist soil.

Appendix 1



Dampening off in canola seedlings



Stunted canola plants



Canola plants and slug from camp 39/1



Camp planted to Thunder that was not replanted. Bare patches clearly visible at bottom. This camp was not replanted due to relatively high density of seedling in non-patch areas.

Appendix 2

Results of germination tests done with Thunder seed.

Camp	Rep	Depth (mm)	Total Germ %		Camp	Rep	Depth (mm)	Total Germ %
39/1	1	25	76	P	40/3	1	16	84
39/1	2	25	78	A	40/3	2	16	98
39/1	1	16	84	S	40/3	1	25	88
39/1	2	16	72	S	40/3	2	25	54
Sand	1	25	66	A	45/3	1	16	90
Sand	2	25	58	G	45/3	2	16	94
Sand	1	16	86	E	45/3	1	25	84
Sand	2	16	88		45/3	2	25	78

Appendix 3

FUNGI ASSOCIATED WITH DAMPING-OFF OF CANOLA IN FIELD TRIALS AT THE LANGGEWENS EXPERIMENTAL FARM

Isolations from damped-off seedlings were done on six growth media (three general and three selective media for *Fusarium*, *Pythium* and *Phytophthora*). Forty eight pieces of diseased roots and hypocotyls were plated. The fungi isolated included *Alternaria* spp., *Fusarium acuminatum*, *F. avenaceum*, *F. equiseti*, *F. oxysporum*, *F. tricinctum*, *Gliocladium roseum*, *Pythium* spp., *Rhizoctonia solani* AG-2-1 and *Mortierella* spp. Of these, *F. avenaceum*, *Pythium* spp. and *R. solani* AG-2-1 can cause severe damping-off of canola. The fact that seed treatment with Cruiser OSD, which target this complex, significantly improved establishment when the canola was replanted, demonstrates that these pathogens played a role in the poor establishment after the first planting.

INVLOED VAN SAADGROOTTE EN GROEIKRAGTIGHEID OP DIE ONKIEMING EN VESTIGING VAN CANOLA.

PJA Lombard en Dr J Strauss

INLEIDING

Oor jare word waargeneem dat daar groot verskille tov ontkieming tussen en binne kultivarproewe in die Wes-Kaap bestaan. Daar word ook gevind dat sekere kultivars swak ontkiem in al die proewe. In die verlede is enkele kultivars geïdentifiseer wat swak ontkiem en was daar gevind dat produsente in die Wes-Kaap soortegelyke probleme ondervind.

Ontkiemings persentasie van kultivars word deur die betrokke saadverskaffer in 'n saadlaboratorium bepaal en op die etiket aangedui. Die ontkiemingstoets dui die aantal normale saailinge aan wat dui op die moontlike vestigings persentasie. Verskeie meer gevorderde toetse word ook uitgevoer wat die groeikragtigheidstoets insluit. Dit gee 'n beter aanduiding tov saadkwaliteit as die ontkiemingstoets. Na oorweging van verskeie faktore is tot die slotsom gekom dat 'n verskil in plantdiepte die moontlike oorsaak kon wees. Hierdie moontlike reaksie op plantdiepte word egter natuurlik nie deur die standaard ontkiemingstoetse gedek nie

Die standaard ontkiemingstoets het ten doel om die hoogste ontkiemingspotensiaal van 'n saadlot onder gunstige toestande (optimum vog, temperatuur, lig en geen grondmikrobes) te bepaal, maar gee nie 'n goeie aanduiding van saailing groeikragtigheid nie. Dit verklaar moontlik waarom verskillende saadbronne in die verlede met dieselfde ontkiemingspersentasie dikwels totaal verskillende stande onder dieselfde kondisies tot gevolg gehad het. 'n Bepaling van die vermoë van saadlotte om tot lewensvatbare groeiende saailinge te ontwikkel gee 'n baie meer duidelike prentjie van wat uiteindelik onder veldtoestande verwag kan word. Hierdie norm staan bekend as die kiemkragtigheid van saad of "seed vigour" en kan deur verskeie geneties en omgewingstoestande sowel as bestuurspraktyke beïnvloed word.

In die verlede is die oorsaak van die swak vestiging van 'n spesifieke kultivar in 'n glashuisstudie nagevors. Die doel was om die kiemkragtigheid en saailing-groeikragtigheid, die sogenaamde "seed- and seedling vigour", te bepaal van die kultivar. Die invloed van plantdiepte was vermoedelik vir die meeste variasie in die stande van produsente verantwoordelik en is dit ingesluit as die hoof behandeling by hierdie studie. Die omgewingsfaktore wat die stand van gewasse beïnvloed, soos reeds hierbo genoem, is sover moontlik konstant gehou met die doel om die interaksie tussen die ontkiemingspersentasie en kiemkragtigheid van saad en die saailing-groeikragtigheid aan die een kant en plantdiepte, groeimedium en saadlot aan die ander, te bepaal.

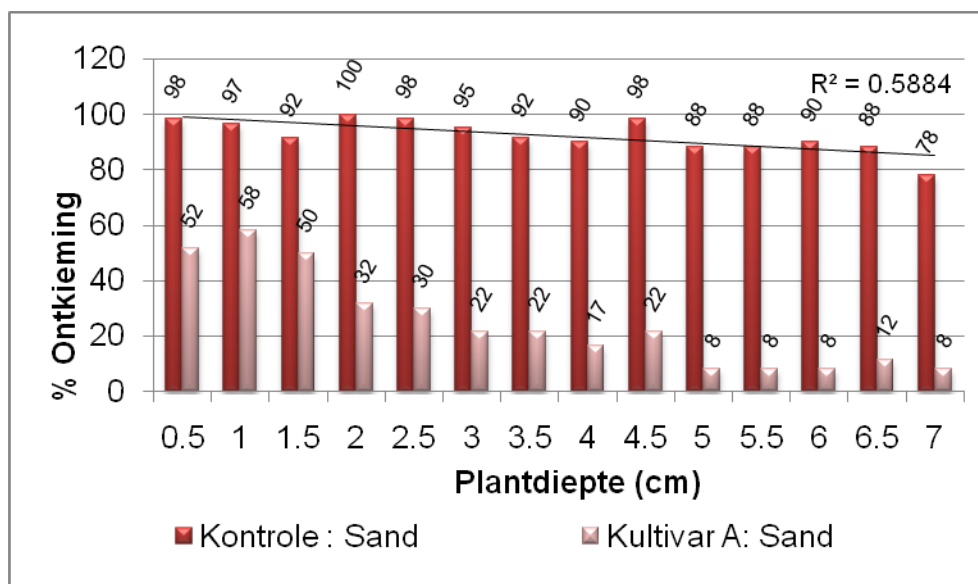
PROSEDURE

Die eksperiment is gebaser op die beginsels van beide die "Standaard ontkiemingstoets" en die "Kiemkragtigheidstoets" (Oregon State University, Seed Services). Sade is in 5l potte in 'n glashuis geplant. Daar is op 14 verskillende dieptes geplant, vanaf 0.5cm tot 7cm diep,

met intervale van 0.5 cm. Gewone kraanwater is driekeer per dag deur middel van 'n gerekenariseerde besproeiingstelsel toegedien. Twee verskillende kultivars naamlik Outback en Varola 44 is in twee verskillende groeimediums geplant naamlik steriele sand en onbehandelde leemgrond wat op die Elsenburg proefplaas versamel is. Die aantal saailinge is daaglik getel oor 'n periode van 14 dae ten einde die aantal en snelheid van opkoms van die saailing te bepaal. Planthoogtes is geneem op 11 dae en 19 dae ten einde die groeikragtigheid van saailinge te bepaal. Terselfdertyd is die aantal dooie saailinge wat as gevolg van saailingsiektes afgesterf het, ook getel.

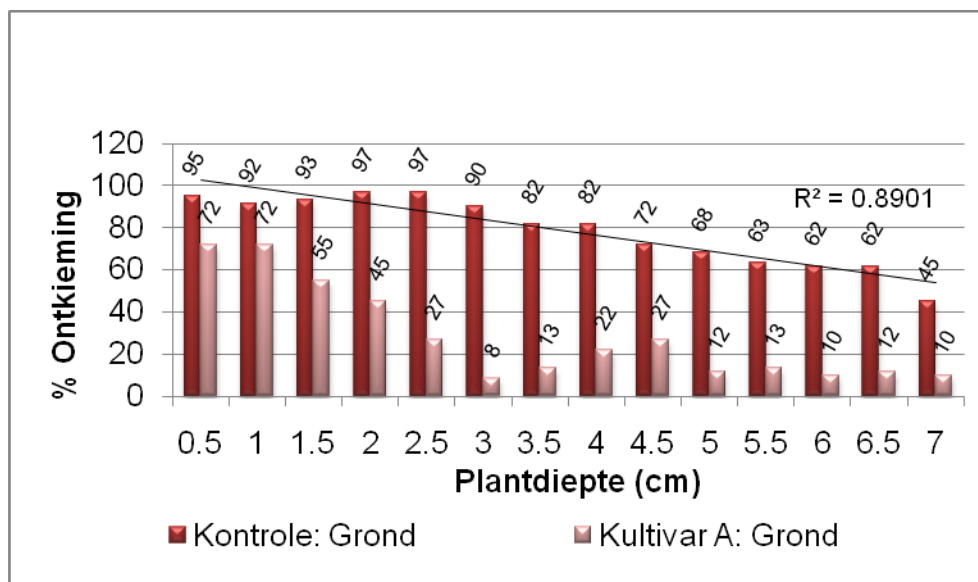
RESULTATE EN BESPREKING

In Figuur 1 word die opkoms van canola saailing na 14 dae in sand getoon en kan die drastiese invloed van saaidiepte op opkoms waargeneem word. Duidelike verskille was ook waarneembaar tussen die twee kultivars. Die kontrole kultivar het duidelik vinniger as kultivar A opgekom. Die kontrole kultivar het in die glashuis met 'n konstante temperatuur 'n ontkiemings persentasie van 80% en beter gehandhaaf tot op 6.5cm plantdiepte. Kultivar A. het deurgaans swakker ontkiem, dit het 'n ontkiemings persentasie van tussen 50 en 58% behaal tot op 'n diepte van 1.5cm. By die saaidiepte van 2-7cm het die ontkieming gewissel tussen 8% en 32%.



Figuur 1. Die vestiging (%) van die kontrole- en kultivar A. by verskillende plantdieptes in steriele sand, veertien dae na plant.

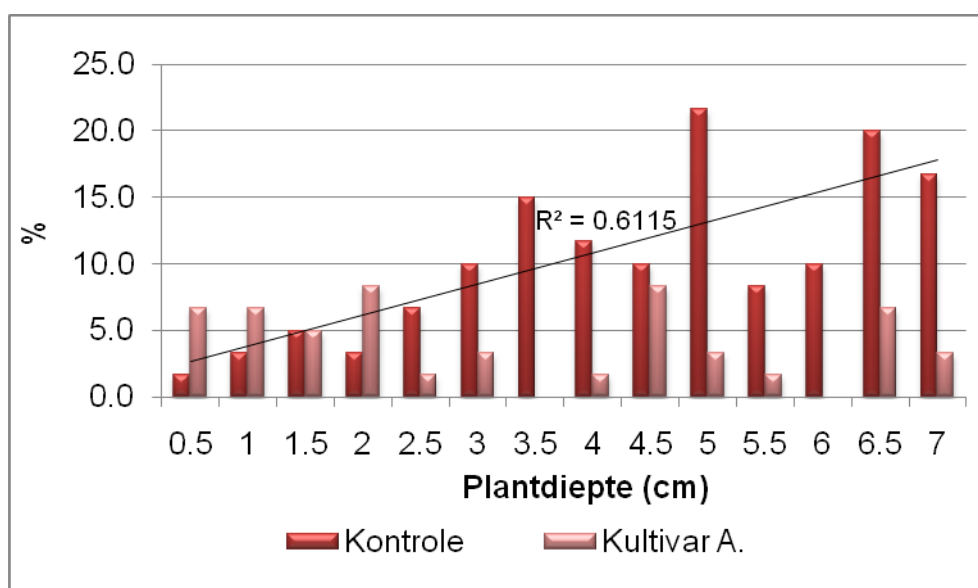
Die ontkieming in grond word in Figuur 2 aangedui. Die kontrole kultivar het soos in die sand deurgaans 'beter ontkiem as kultivar A. Die ontkiemings persentasie van die kontrole kultivar het gewissel tussen 82% en 97% tot op 'n plantdiepte van 4cm. Die ontkieming het afgeneem soos die saaidiepte dieper geword het. Dit het afgeneem van 72% (4.5cm) tot 45% (7cm).



Figuur 2. Die vestigingspersentasie van die kontrole- en kultivar A. by verskillende plantdieptes in grond, veertien dae na plant.

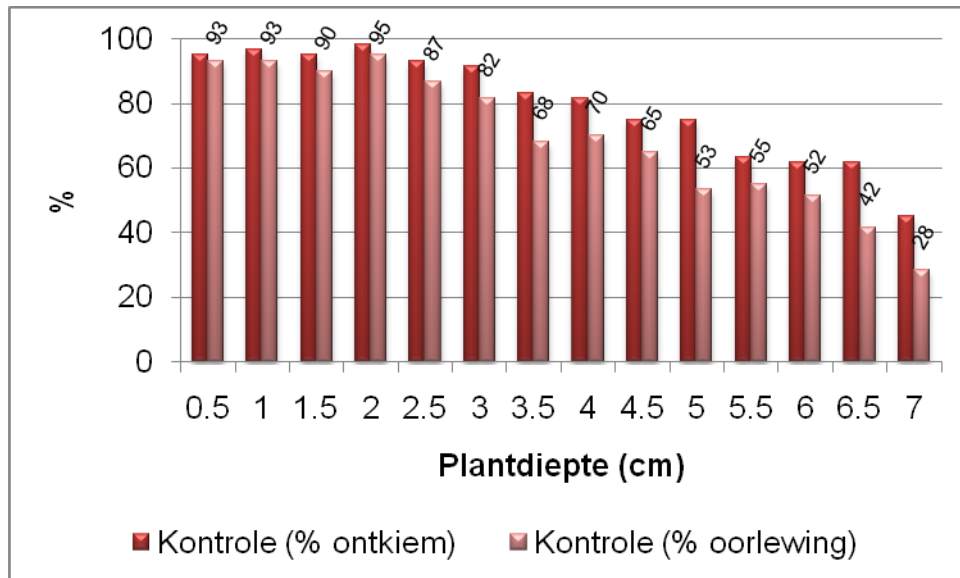
Kultivar A. het deurgaans swakker ontkiem in die grond, dit het 'n ontkiemings persentasie van tussen 42% en 72% behaal tot op 'n diepte van 2cm. By die saaidiepte van 2.5-7cm het die ontkieming afgeplat en gewissel tussen 8% en 27%.

Ooglopende verskille was waarneembaar tussen die verskillende kultivars maar ook tussen die groeimediums. Die grootste verskil tussen mediums was by die kontrole kultivar waarneembaar. In die grond medium het die ontkieming merkbaar afgeneem waar dieper as 2.5cm geplant is. 'n Betekenisvolle reglynige korrelasie ($R^2=0.89$) het voorgekom.



Figuur 3. Persentasie saailingvrektes van die kontrole- en kultivar A. by verskillende plantdieptes.

Figuur 3 dui die data aan van die aantal saailingvrektes wat voorgekom het nadat die saailinge ontkiem het. Geen tendens was waarneembaar by kultivar A. nie. By die kontrole kultivar was 'n groot toename ($R^2=75.99$) in saailing vrektes waarneembaar soos die plantdiepte toeneem het. Die grootste persentasie afsterwe het voorgekom by die 6.5 en 7cm plantdiepte.



Figuur 4. Ontkiemings- en oorlewingspersentasie van die kontrole kultivar in grond by verskillende plantdieptes.

Die oorlewingspersentasie kontrole saailinge het gewissel tussen 82% en 95% tot op 'n saaidiepte van 3cm. Die oorlewingspersentasie het egter afgeneem vanaf 'n 2cm (95%) tot 7cm (28%) plantdiepte. Plantdiepte het nie net die ontkiemingspersentasie beïnvloed nie maar het ook in hierdie studie 'n beduidende invloed op saailingsterftes gehad.

GEVOLGTREKKING

Die studie bewys dat saadkwaliteit en plantdiepte van canolasaad 'n betekenisvolle invloed op ontkieming en vestiging van saailinge het. Die saad wat in die studie gebruik is, was met verskillende middels behandel deur die onderskeie maatskappye. Dit kon 'n invloed gehad het op die voorkoms van saailingsiektes tussen kultivars hoewel die invloed van plantdiepte baie duidelik na vore kom.

Minder gunstige omstandighede kom op die land voor en saailing word blootgestel aan verskeie faktore wat die vestiging kan beïnvloed nl. grondvogstatus, grondtemperatuur, plantdiepte, insek- en siektes, die kiemkragtigheid van saad asook die groeikragtigheid van saailinge.

Dit is veral kiemkragtigheid en saailinggroeikrag wat 'n uiters belangrike rol speel in die daarstelling van 'n goedgevestigde canola stand. Die standaard ontkiemingstoets kan egter nie die prestasie van canolasaad akkuraat voorspel onder veldtoestande nie en gevolglik kan kiemkragtigheids toetse van groot waarde wees.

Die invloed van plantdiepte op die vestiging van canola en die gevolglike verdere ontwikkeling van saailinge is duidelik met hierdie studie bewys. Canola moet tussen 0.5 en 4cm diep geplant word sodat die maksimum aantal saailinge so vinnig moontlik kan vestig. By vlakker plantdieptes is die voorkoms van saailingvrektes aansienlik minder en neig saailinge om baie meer gelyk op te kom met die gevolg dat beter en meer egalige stande so verseker word.

INSEKBEHEER BY CANOLA
J Bruwer (SSK)
AKKERBOUKUNDIGE

LUISE :

Alhoewel ander plantluisspesies ook canola infesteer is die koolluis (*Brevicoryne brassicae*) tans die primêre spesie wat op canola voorkom.

Canola is uiters gevoelig vir luisbesmetting in vroeë groeistadiums, veral vanaf opkoms tot rosetvorming. Luise in groeipunt tydens rosetfase kan groei strem. Swaar en langdurige besmetting tydens blom en peulstadium kan ook blomvorming verhoed en die set en vulling van peule erg benadeel (Foto 1 & 2). Koue vertraag die opbou van populasies.

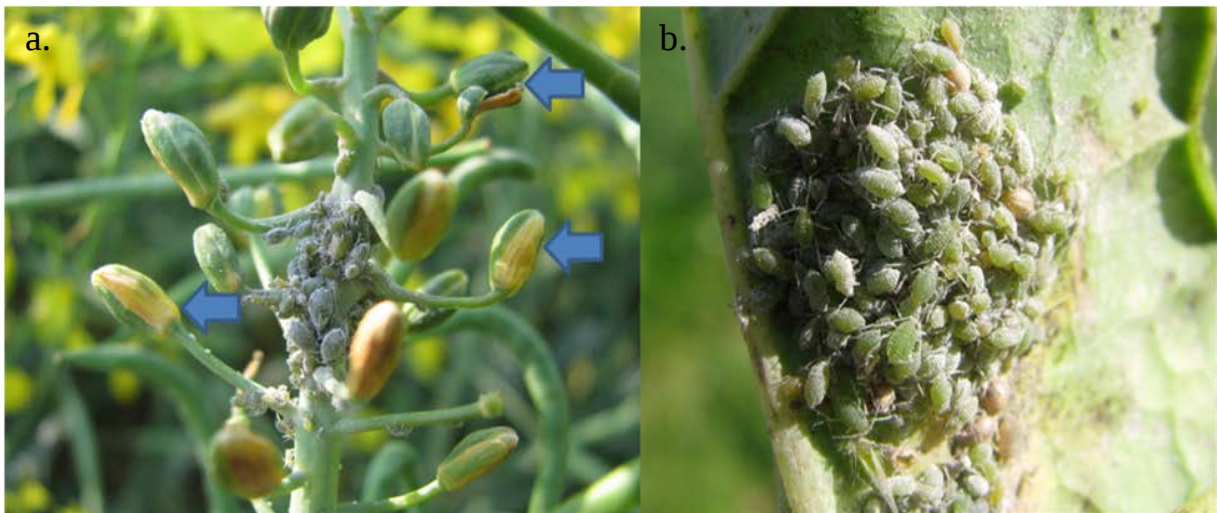


Foto 1: a. Koolluise, blomme is besig om te speen weens luissskade, b. Koolluise onder canolablaar

‘n Riglyn wat gevolg kan word voordat gespuit moet word, is wanneer 20 % van plante besmet is. Die boonste gedeelte van die stingel moet 2 –3 cm lank met luise besmet wees. Gereelde inspeksies tydens blom en peulstadium is baie belangrik.



Foto 2. Koolluis strem blomvorming en peulset

RUITRUGMOTLARWE : (PLUTELLA XYLOSTELLA)

Die ruitrugmotlarwe is 'n insek wat onderskat word en meer skade aanrig as wat ons dink. Afhangende van die omgewingstemperatuur kan die mot al by stingelverlenging opgemerk word. Die liggroen larwe vreet gaatjies in die blare. Peule word ook aangeval. Die buitenste skilletjie word afgevrete. Sulke peule is geneig om makliker oop te spring. Peule word selde deurboor.



Foto 2: a. Ruitrugmot, b. Larwe na papie stadium, c. Larwe met skade aan peul
Die volgende drumpelwaardes geld vir die ruitrugmotlarwe :

Middel tot laat blom : 17 tot 23 larwes per 10 plante
Peulvulling : 43 tot 57 larwes per 10 plante

Monsterneming is uiters belangrik. Moet nooit aan die kant van die land begin monsters neem nie. Infestasië is gewoonlik hoër. Stap so 15 meter die land in voordat monsters begin neem word. Neem monsters met intervale van 25 meter. Larwes langer as 3 tot 4 millimeter moet getel word. Reënval meer as 5-8 mm in 'n 24 uur periode kan die populasie aansienlik verminder. Warmer weer tydens blom en peulvulling sal populasie verhoog. Die ruitrugmotlarwe word dikwels verwar met die vroeë instar van die bolwurm.

BOLWURM : (HELICOVERPA SPP.)

Larwes verskil van kleur wat wissel van liggroen tot donkerbruin. Swaar bolwurm infestasië gaan gewoonlik gepaard met swaar luisbesmettings, aangesien die motte op die heuningdoo, wat deur die luis afgeskei word, voed. Larwes (groter as 1 cm) boor in peule en veroorsaak opbrengsverlies.



Foto 3. Bolwurm

Drumpelwaarde :

4 tot 5 larwes per vierkante meter

Aanplantings moet vanaf die blomstadium gemonitor word.

Gereelde inspeksies is uiters noodsaaklik om bogenoemde insekplae doetreffend te beheer en opbrengsverliese te beperk.

Fotos: PJA Lomard

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Geborg deur die Proteïennavorsingstigting

Besoek die PNS se webblad by www.proteinresearch.net vir vorige uitgawes van nuusbriewe en pamflette.