

## PESTS AND DISEASES ATTACKING WINTER CANOLA IN THE USA

C.B. Hill

Ameri-Can Pedigreed Seed Company,  
7664 Moore Road, Memphis, TN USA 38120

INTRODUCTION

Relatively few pests and diseases have become threatening to winter canola in the USA compared to other canola-growing regions of the world. A brief assessment of the major diseases and pests found on winter canola in the USA is presented here.

STEM ROT

Considering the frequency of occurrence, stem rot, caused by the fungal ascomycete Sclerotinia sclerotiorum (Lib.) deBary, is the most important disease of winter canola in the USA. It is found in nearly all winter canola fields. It occurs with very low incidences (frequency of infected plants) or with incidences of 50% or higher. Disease severity depends on the precise synchronization of blooming period, ascospore release and a period of cool, moist environmental conditions. Severe yield losses to stem rot in the USA have been sporadic but can be expected to increase with the expansion of canola acreage.

Crop rotation has been recommended as a means to reduce the threat of the disease in a particular field. The very wide host range of the fungus, however, limits the choice of non-susceptible crops to non-host species such as winter wheat. Also, the occurrence of the disease on weeds, such as Thlaspe arvense L., and the wind transport of airborne ascospores to neighboring fields reduces the effectiveness of rotation.

In the absence of suitable genetic resistance or biological control methods, chemical control may be the best short-term solution to protecting the winter canola crop in the USA. Benomyl had emergency use registration in Kentucky and North Dakota in 1991. A shortage of benomyl in the USA in 1991 limited fungicidal control of stem rot.

BLACKLEG

Although its distribution appears to be restricted in the USA at present, blackleg, caused by the pseudothelial fungus Leptosphaeria maculans (Desm.) ces et de Not, may have the greatest destructive potential of any winter canola disease in the USA. Virulent strains of the fungus have so far been found on canola in western Kentucky,

southern Illinois, northern Mississippi, western Tennessee and southern Michigan. The only serious epidemic occurred in a limited area in southwestern Kentucky in 1989 where there was 80-100% yield loss in infected fields (Mengistu, et al., 1990). The strains found in Kentucky behave as PG3 or PG4 isolates according to their pathogenicity on cvs. Westar, Quinta and Glacier (Mengistu, et al., 1989).

Short-term protection of the canola industry in the USA involves controlling the seed-borne spread of virulent strains of L. maculans into new areas where they may not already exist. The fungicide benomyl, the only fungicide registered in the USA for use as an eradicant seed treatment, is used by most seed companies on commercial canola seed in combination with phytosanitary testing and seed certification. The US Canola Association is recommending that all commercial canola seed be treated with a suitable fungicide (benomyl) and be phytosanitary tested. States are moving toward making seed treatment a requirement for commercial sale of canola seed within their borders. Kentucky was the first state to do so in 1990. Other states following Kentucky's lead include Arkansas and Georgia.

Chemical control of blackleg on field plants with foliar fungicides has not been thoroughly tested in the USA. Research results from other parts of the world suggest limited effectiveness.

European-developed blackleg resistant winter canola cultivars have begun to appear in the USA recently. Their productivity in high blackleg infected areas in the USA is not yet established. Disease nurseries have been established in Kentucky by some US seed companies to facilitate the selection and testing of resistant canola germplasm.

### BLACK SPOT

Alternaria brassicicola (Schw.) Wiltshire appears to be the primary Alternaria species causing black spot on winter canola in the USA. Black spot can probably be found in most winter canola fields in the USA, however, there have been no reports of extensive economic damage. Since the organism survives in infected canola debris or on susceptible cruciferous weeds, there may be increased potential for economic damage as canola acreage is expanded. Currently, there are no suitable control methods available for controlling black spot in the USA.

### WINTER DECLINE SYNDROME

Winter decline syndrome is a complex of maladies that lead to the gradual reduction of canola stands during the late winter and early spring months. The tap roots of infected plants rot and their crowns become rotten and hollow inside. If the syndrome begins prior to

bolting, infected plants remain stunted while uninfected plants grow normally and bolt. Plants infected early gradually disappear if the syndrome persists, or they may recover if growing conditions improve, although they may be permanently weakened. Plants infected later in the season, or plants with crown areas weakened by previous infection, usually lodge. Stands can be reduced by 90% in the worst cases.

The primary causes of the winter decline syndrome are unknown but are probably physical factors that damage plants and provide ports of entry for secondary biotic factors. Water-logging may directly cause root damage or it may reduce plant vigor and increase the plant's susceptibility to low temperatures. Sub-lethal low temperatures may cause minor crown damage. Heaving during alternating warm and cold periods in winter can damage the crowns and roots. Wireworm, scarab beetle and root fly larval feeding may also cause some primary damage. Secondary damage is caused by soft-rotting fungi, including Fusarium spp., and bacteria, and by seed corn maggots, Delia platura (Meigen), that enter damaged plants. Canola grown on well-drained soils and adequately cold-hardened, appears to be less susceptible to winter decline syndrome.

#### OTHER DISEASES

Other diseases, such as aster yellows, black rot, gray mold, powdery mildew and wirestem have been found on winter canola in the USA. They have not been economically important.

Aster yellows (mycoplasma-like organism) is found in all canola fields affecting only about 1% of the plants. In 1991, however, some fields in the mid-southern states had up to 5% infection.

Black rot (Xanthomonas campestris pv. campestris (Pam.) Dow) frequently attacks winter canola in the southern states in spring, too late to cause much economic damage. It is rarely found infecting plants in the fall during the early plant developmental stages when the plants would be more vulnerable to severe damage.

Occurrences of gray mold (Botrytis cinerea Pers.) and wirestem (Rhizoctonia solani Kuhn) are sporadic, depending on local weather conditions.

Powdery mildew (Erysiphe cruciferarum Opiz ex. Junell) is often common during the ripening stage in Georgia.

#### INSECTS

There are a few predominant insect pests on winter canola in the USA. They have become increasingly important in the winter crop in the mid-southern states. Sporadic outbreaks of these pests have caused extensive damage in some areas.

Cabbage seed pod weevil, Ceutorhynchus assimilis (Paykull) has been found on canola in the northwestern states as well as in southern Illinois, western Kentucky, Tennessee and northern Georgia. It has reportedly reduced yields by as much as 30% in the northwestern states. Similar yield reductions have probably occurred in the mid-southern states.

Heavy aphid infestations occur sporadically in the mid-western and mid-southern states. Brevicoryne brassicae L. appears to be the predominant species attacking winter canola in the USA. Other aphid species found on canola include turnip aphid, Lipaphis erysimi (Kaltenbach) and the green peach aphid, Myzus persicae (Sulzer).

A number of other insects have periodically caused minor damage on canola in various parts of the USA. Crucifer-specializing lepidoptera larvae, such as Pieris rapae (L.), the imported cabbage worm, and Plutella xylostella (L.), the diamondback moth, are often found in winter canola fields. General feeders, such as Periodroma saucia (Hubn.), the variegated cutworm, are less common. Flea beetles, Phyllotreta spp., have caused very little if any damage on winter canola in the USA, although they exist in areas where the crop is grown. False chinch bugs (Nysius spp.) have occasionally been observed on winter canola in mid-western states, in high numbers in fall or in spring, without causing any apparent economic damage.

#### CONCLUSION

Although diseases and pests have so far been relatively unthreatening to winter canola crops in the USA, they may be expected to become problematic as the canola industry expands in the USA. Populations of endemic pathogens and insect pests will probably increase as the winter canola areas expand and become more concentrated. It is hoped that exotic pathogens such as Pyrenopeziza brassicae Sutton and Rawlinson (light leaf spot), and insects such as Dasyneura brassicae Winn. (pod midge), continue to be excluded from the USA.

#### REFERENCES

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