

Lygus Bugs in Dry Beans and Soybeans

Lygus bug nymphs caused more yield and quality loss than adults, and the greatest quality losses were incurred from damage at the seed development, filling and maturity stages. Navy beans exhibited more seed pitting damage than pinto beans.

LYGUS BUGS ARE a pest of several crops in Manitoba. The term lygus bug refers to any member of plant bug in the genus *Lygus*. Adults and nymphs feed on flower buds, seeds and pods using piercing mouthparts that extract plant sap. Lygus feeding on dry bean seeds results in sunken perforated areas, negatively impacting quality.

Economic loss due to lygus bugs in dry beans does not occur in most years in Manitoba. However, quality may suffer when lygus bug numbers are extremely high in a given region. Observations of lygus bugs feeding on dry beans in Manitoba in 2007 prompted concerns about their effects on yield quality and quantity. Little is known about the species composition or seasonal patterns of lygus bug occurrence on dry beans in Manitoba. This research aimed to address that.

Seventeen navy bean, 10 pinto bean and nine soybean fields were surveyed for lygus bugs from 2008–2010. At the centre and margins of these 36 fields, sweep net and tap tray samples were taken weekly and species were identified. Additionally, in the laboratory and field cages, researchers investigated the effects of feeding by tarnished plant bug (*Lygus lineolaris*) adults and fifth instar nymphs on different development stages of navy beans to characterize short-term effects of feeding and long-term effects on yield.

Of the adult plant bugs captured, 78–95% were tarnished plant bugs (*L. lineolaris*), less than 10% were alfalfa plant bugs (*Adelphcoris lineolatus*) and other species made up the remainder (*L. elisus*, *L. borealis*). Species composition varied among years but not among crops. *Lygus lineolaris* reproduced in dry beans and soybeans and completed a single generation.

In dry beans, lygus bug adults were first collected in late July during the late vegetative and early pod set stages, and females laid eggs in the crop. Nymphs hatched, developed and were most abundant at the seed development and seed filling stages. At seed maturity, late instar nymphs and adults were present. This indicates that the first generation of reproductive adults immigrated to the crop and the second generation developed in-crop.

Lygus lineolaris reproduced in soybean crops, but nymphs had poorer survival than in dry beans. In late August and early September, adult numbers peaked in dry beans and soybeans partly due to immigration of adult lygus bugs from earlier maturing crops. Dry beans and soybeans appeared to be a host for transient alfalfa plant bugs. There were no effects on yield quality or quantity associated with the numbers of plant bugs seen in these field surveys. Seed pitting was found on navy beans but was negligible on pinto beans.



Lygus bug fifth instar nymph, about 4 mm (1/6 inch) long.



Lygus bug adult, about 5 mm (1/5 inch) long.

Photos: T. Nagalingam



Pitting from lygus injury at the seed filling stage.

Photo: T. Nagalingam

In laboratory and field cages, *L. lineolaris* nymphs were found to be more damaging than adults. Feeding damage also varied by plant development stage. At flowering to pod initiation, buds, flowers or pods were aborted. Pod loss sometimes reduced yield, but seed quality was unharmed.

The late-season stages were most at risk from lygus bug damage. Feeding during seed development and filling resulted in shrivelled seeds and pods, consequently reducing seed weight. At seed maturity, feeding caused direct seed injury, resulting in pitted seed coats. There was no loss in yield quantity when feeding occurred at seed maturity, but seed pitting reduced yield quality. Although all growth stages were vulnerable to lygus, the late-season stages were most at risk since displaced lygus from harvested crops moved into maturing dry beans and caused quality loss.

Lygus bug population numbers were not high enough during the years of this research for an economic threshold to be developed. A suggested nominal threshold was proposed of 10 lygus adults/m² at the beginning pod (R2) to mid-bloom (R3) when conditions are not favourable for the plants but are favourable for lygus bugs (e.g., hot and dry). This is based on the 2009 field cage experiment that found that 1 adult/m² reduced yield by 0.6 g/m², or roughly 5.4 lbs/ac. ▀

PRINCIPAL INVESTIGATOR Dr. Neil Holliday, University of Manitoba

MPSG INVESTMENT \$50,300

CO-FUNDERS University of Manitoba Graduate Fellowship; Agri-Food Research and Development Initiative

DURATION 3 years