

## Insecticides Required to Meet Consumer Demands for Sunflower Seeds

*U.S. Pesticide Benefits Case Study No. 25, May 2011*

*Leonard Gianessi and Ashley Williams*

North Dakota, South Dakota and Minnesota account for two-thirds of U.S. acreage of commercial sunflowers. Approximately 209,000 acres are grown for confection food uses, producing a volume of 273 million pounds. A set of trade standards have been developed for non-oil sunflower kernels that stipulate there should be no more than 2% insect damage [1].

The NDSU budget for confectionery sunflowers includes a spray targeted at head feeding insects: red seed weevil, lygus bug and banded sunflower moth [2]. The NDSU Extension Service recommends that sunflowers grown for the confectionery market be treated a minimum of two times for these three pests [3]. Growers who do not spray at all invariably have insect damage above 10%, which renders the entire crop unfit for human consumption [4].

The red sunflower seed weevil deposits eggs in sunflower seeds and the larvae feed in the developing sunflower kernels destroying a portion of the kernel. A single female red sunflower seed weevil lays enough eggs to damage an average of 20 seeds. Insecticide treatments reduced seed weevil damage by 93-96% [5]. Sunflower leaves contain a combination of chemicals, volatiles, and moisture that stimulates egg-laying by the banded sunflower moth [6]. Larvae penetrate and consume the contents of seeds. Kernel brown spot was observed for the first time in 1998. The spot is superficial with little or no tissue degradation. Processors are allowed only 0.5% brown spot damage in their finished product [7]. Feeding by the lygus bug was identified as the source of kernel brown spot. Though lygus bugs don't eat much, they inject plant tissues with digestive enzymes and extract nutrients [8]. Lygus insert their mouthparts into the host, start a pre-digestion pump to inject saliva and start digestion, then suck the fluids into the stomach. The saliva is toxic to plant tissue, helping reduce the plant fluid into a digestible source. Research has shown that lygus are controlled by the same insecticide sprays that control banded sunflower moth and seed weevils [7].

### References

1. Optimizing the quality of your confection crop. *The Sunflower*. 1998: April/May.
2. Swenson, A. and R. Haugen. 2005. *Projected 2006 Crop Budgets South Central North Dakota*. North Dakota State University Extension Service. Farm Management Planning Guide, December.
3. North Dakota State University. *Field Crop Insect Management Guide*. NDSU Extension Service Report E-1143.
4. Keep the banded moth in your cross hairs. *The Sunflower*. 2002: March/April.
5. Gednalske, J.V. and D.D. Walgenbach. 1984. Influence of insecticide application timing on damage by *Smicronyx fulvus* and *S. sordidus* (Coleoptera: Curculionidae). *Journal of Economic Entomology*. 77:1545-1548.
6. Barker, J.F. 1997. Oviposition by the banded sunflower moth (Lepidoptera: Cochylidae) in response to constituents of the bracts and leaves of *Helianthus annuus*. *Journal of Economic Entomology*. 90(1):160-164.
7. 2001. Confections seeing spots. *The Sunflower*. January.
8. Charlet, L.D. and T.J. Gulya. 2002. Zeroing in on a confectionary sunflower blemish. *Agricultural Research*. February.



Spraying sunflowers



Sunflower weevil damage



Banded sunflower moth damage



Kernel brown spot from lygus bug damage