Wheat stem sawfly is a major threat to small grain production in Montana. Grain yield losses exceeded **$25 million** in 1995. Documented reports and observations indicate that **sawfly-infested acres and losses are increasing** in the state. Factors favoring sawfly buildup include residue management, late maturing winter wheats, hollow stem wheats, and farming in strips. It is clear that **a 'silver bullet' does not exist** for sawfly control. Therefore MSU research and extension efforts are focused on developing a package of pest management strategies that **attack this pest from a number of different angles**. These strategies include

- fall and spring tillage,
- host plant resistance,
- blending varieties,
- biological control,
- harvest practices,
- crop rotation, and
- potential of sawfly- and plant-produced attractants

Project Personnel

Entomology
Dr. Sue Blodgett
Dr. Michael Ivie
Dr. Greg Johnson
Dr. Andy Lenssen
Dr. Wendell Morrill
Dr. David Weaver
Hayes Goosey
Sharlene Sing
Debra Waters

Extension Service
Bob Brastrup
Wade Crouch
Pat Graham
Bob Kirby
John Maatta
Bobbie Rumbaugh
Judee Wargo

Plant Breeding
Jim Berg
Dr. Phil Bruckner
Susan Lanning
Dr. Luther Talbert

MSU Research Centers
Gregg Carlson
Dr. Joyce Eckhoff
Dr. Greg Kushnak
Dave Wichman

Web address:
http://scarab.msu.montana.edu/ipm/

Montana State University

Wheat stem sawfly

Research & Demonstration Projects

Funding provided by:

Montana State University Agricultural Experiment Station
Montana State University Extension Service
Montana Wheat & Barley Committee Research & Marketing

Wheat stem sawfly
management strategies

Insecticides

Numerous insecticides, different application techniques, and multiple applications have been evaluated for several years against sawflies • To date insecticides have produced inconsistent results and are not recommended for sawfly control • While adult sawflies are relatively easy to kill, a management program would require multiple applications at 3- or 4-day intervals over a 4- to 6-week period, which would be cost prohibitive • Test results using systemic seed treatments and foliar insecticides applied after egg laying indicate negligible control of sawfly eggs and larvae that are inside the wheat stem • We will continue to evaluate new products and application technologies as they become available.

Biological Control

Sawflies in wild grasses are often attacked by parasitoids • Two species of parasites are now attacking sawflies in wheat • The parasites are small wasps that lay eggs on sawfly larvae in stems • The sawfly larvae are killed before stems are cut • Data have been collected where 70% of sawfly larvae are killed by parasitoids • Factors that affect parasite activity and distribution are not known • The possiblity of introducing parasites collected from overseas is being investigated.

Population Dynamics

Selected wheat fields in the Triangle have been intensively sampled for wheat stem sawfly adults and larvae • Studying the population dynamics of the sawfly will enable us to better understand what factors are important in regulating survival and mortality • This information will assist us in determining the impact various management tactics have on sawfly populations and provide new or improved approaches that may be developed and implemented.

Resistant Varieties

Using a solid stem variety of winter wheat (Vanguard, Rampart) or spring wheat (Fortuna, Lew, Ernest) is the best option currently available for sawfly management • The sawfly larva is unable to successfully tunnel through the solid stem and dies before cutting the stem • Semi-solid varieties, such as Amidon, Glenman and Border, are moderately resistant, although some tillers will be infested and successfully cut by sawfly larvae • It is economically beneficial to seed solid stem varieties where sawflies are a problem • A farm-level economic analysis computed by the MSU Department of Ag Economics and Economics indicated that dollar net returns per acre were higher using solid stem varieties where sawflies were a problem compared to net returns using hollow stemmed wheat • Improved sawfly-resistant varieties are being developed.

Wheat Blends

Blending resistant and susceptible winter wheat varieties is being examined to determine if grain yield and quality can be improved by including the hollow stemmed wheat, while reducing losses due to sawfly infestations by using solid stemmed wheat • Blends of Rampart (resistant) and Rocky or Norstar (susceptible) have been planted on-farm in three Montana sites • Blend ratios (solid/hollow) include 100/0, 75/25, 50/50, 25/75, and 0/100 • Stem solidness, egg laying, larval infestation, and yield will be determined for each variety in the blend.

Tillage

Experiments were conducted in Fall 1995 and 1996 to determine if working the ground with shovels and rods would increase mortality of sawfly larvae infesting stubble • Tilling stubble shortly after harvest did not significantly increase mortality of sawfly larvae compared to untilled ground • We found that stubble in tilled plots had enough soil clinging to the crowns that larvae were protected from freezing temperatures and desiccation • For tillage to be effective, the stubble needs to be free of soil • To achieve this, we used a rotary harrow this spring in our fall-tilled plots to see if the action of the harrow would break up the soil clods and produce soil-free stubble • Results were encouraging, and we plan to include a rotary harrow in our fall tillage experiments in 1997.

Exploring Plant- and Sawfly-Produced Attractants

The role of plant- and sawfly-produced chemicals is one area of growing interest • Identifying attractive chemicals produced by the insect will enhance our understanding of how sawfly populations move through a field and how they select a stem for egg laying • Identifying volatile chemicals released from sawfly-infested plants will help us understand how sawflies and their natural enemies are able to determine whether a wheat stem is infested • This project, recently initiated, has the potential of providing new approaches to sawfly management.