8.0 PEST AND PREDATOR MANAGEMENT

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Pests and predators can be a great concern to cow/calf operators. The sharing of natural resources among wildlife, agriculture and other human activities can increase pest and predator damage to an operation.

8.1 Burrowing Rodents

Damage caused by burrowing rodents is usually more detrimental to crops, soil stability and the land than damage caused by birds or ungulates.

The three main rodents that cow/calf producers encounter are:

- Richardson's ground squirrels – also called gophers or prairie gophers.
- Pocket gophers – also called moles.
- Voles – also called field mice.

Ground squirrels are a major food source for badgers, which also damage fields as they dig for the squirrels. Although badger populations are not widespread, damage can be considerable.

Burrowing rodents are permanent residents of land. Damage can vary greatly depending on the size and type of crop and rodent population densities.

The greatest concerns are that burrowing:

- Creates holes that could injure livestock and damage machinery.
- Creates rough land surface resulting in equipment damage.
- Increases weed growth.
- Reduces crop yields.

Burrowing rodents need subsurface tunnels and above-ground corridors for food, nesting, escape, and to multiply. They cannot tolerate mechanized disturbance, particularly deep cultivation or continuous surface activity. Therefore, rodent damage will be greater in fields with perennial and direct-seeded crops, and in chemical fallow systems. When such management systems are coupled with poor weed control, rodent populations can be very high. In particular, Richardson's ground squirrels thrive in weedy, fallow fields and thin, short forage stands. But, some rodents may actually benefit crop production in direct-seeded fields. For example, researchers at the University of Guelph have found that mice and small insects eat most of the weed seeds in zero tillage fields because the seeds are exposed on the soil surface.

8.1.1 Controlling burrowing rodents

Historically, farmers controlled damage from burrowing rodents by destroying them with poisons, traps, fumigants and other "on-farm" inventions. Control methods and strategies are the same in direct-seeded, conventional tillage or perennial forage stands. Ground squirrels can rapidly invade an area, which makes it crucial to apply control measures as soon as the squirrels are seen in a field. Although pocket gophers and mice invade areas more slowly, control measures applied early keep population levels down.

There are different approaches to controlling rodents and the most effective method is to combine these different approaches.

Using poisons on targeted species

- Use poisons such as strychnine alkaloid and zinc phosphide to control pocket gophers and ground squirrels.
- Anticoagulant poisons, such as chlorophacinone and diphacinone, are now registered for pocket gophers and ground squirrels, although control of pocket gophers with poison ranges from poor to fair. Most of these food poison baits are available in ready-to-use formulations. Follow the label instructions for use.
- Place pocket gopher poison directly into the burrow system using a specially designed probe or an artificial burrow builder.
- Some research indicates that fall baiting is more effective than spring baiting.

Using traps on targeted species

- Trapping, using specially designed hand-set traps, is the only long-term solution for pocket gopher control. The traps work well because pocket gophers often plug the openings in their burrows. When a trap is set in an open burrow, the pocket gopher becomes trapped when it attempts to plug the opening.
- Trapping is most effective when gopher numbers are low and the infested area is small. Because pocket gophers do not travel much in a given year and do not live in cultivated land, trapping along the perimeter of new perennial stands prevents their migration into the field. By trapping all perimeter areas, whole fields can be controlled.

Hunting pests within the regulations

- Although very effective in the short-term, hunting is only effective as a long-term solution if it is extensive and thorough. While some animals may be frightened away, whether they return to the area or not is determined by the species' ability to travel.
- When hunting pests that hibernate, do not miss the time of year when they are most active. These periods of activity can be quite short.
- During hunting, Richardson's ground squirrels immediately retreat to their burrows. Hunting is relatively ineffective long-term unless the population is significantly reduced.

8.2 Wild Ungulates

Wild ungulates, such as deer, moose and elk, can cause serious crop damage when feed for early winter grazing, swath grazing or spring carryover grazing is preserved in swaths or bales. Deer and elk are attracted to the quality of the feed in the field relative to alternative feed sources within their habitat. Pay special attention to riparian areas where abundant forage growth may attract greater numbers of deer and moose. Since riparian areas have relatively moist soils, high numbers of wild ungulates may cause significant hoof damage.

8.2.1 Controlling deer and elk

The following management practices can deter deer and elk.

- Wrap round bales and stack at least two tiers high. Keep sides as straight as possible to prevent deer and elk from climbing the stacks.
- Stack bales near buildings to serve as barriers.
- Use machinery to protect stack yards.
- Clean up spilled grain, loose hay and other feed.
- Do not allow wildlife to linger because they attract other wildlife.
- Keep wildlife away from farmyards. Scarecrows wearing human-scented clothing and radios may be enough to keep wildlife away if the animals have not become used to humans or are completely dependent on food available in the farmyards.
- Contact the local Alberta Fish and Wildlife office for information on stack protection, scaring devices, repellents, fencing and other prevention programs.

8.3 Wildlife Predation

Conflicts between wild predators and livestock have a long and colourful history in Alberta. Livestock losses to predation occur wherever livestock are raised within the natural ranges of predators. The predominant species involved in predation are coyotes, wolves and bears. The coyote is responsible for the majority of livestock losses in Alberta. Coyotes have expanded their historic range tremendously and are now established in all regions of the province. Wolf and bear predation is generally restricted to the forested areas of Alberta.

Alberta Agriculture, Food and Rural Development (AAFRD) and Alberta Sustainable Resource Development (ASRD) share responsibility for the management of wildlife predation. AAFRD manages livestock predation by coyotes under the authority of the *Agricultural Pests Act* of Alberta. ASRD, Fish and Wildlife Division, manages predation by wolves and bears under the authority of the *Wildlife Act* of Alberta.

8.3.1 Preventing wildlife predation

Coyotes, wolves and bears are opportunistic predators and may attack livestock in pastures, corrals or confined areas. Wildlife predation can occur despite the best efforts of livestock producers. It is paramount that management practices deter predators and discourage their activity around the farm.

Prevention is the best management practice for producers. Once predation has occurred, it usually requires a more concerted effort involving increased time and surveillance to stop the problem. There are several farm management strategies that can assist cow/calf producers in keeping losses to a minimum.

Carrion disposal
Dispose of all dead livestock, stillborn calves and afterbirth by liming and deep burial, or burning. Rendering plants will pick up dead cattle, although a fee is now charged for this service. Some municipalities allow carcass disposal at landfill sites. Avoid carcass or bone piles on the farm, unless in a fenced area, as they attract predators.

Surveillance
Aim to have all calving done as close to the farmyard as is reasonably possible to allow for close surveillance.

Check pregnant cows on a regular basis once calving begins. This is especially prudent for first-calf heifers and any cows experiencing difficulties. Pen these animals near the yard as there is a direct correlation between the amount of time a producer spends with the herd and the potential for livestock losses.

Shooting
Carry a rifle when checking herds, especially if there are predator problems. Ensure the rifle is sighted accurately and be confident using a firearm.

Herding and guardian dogs
A well-trained guard dog can be valuable on the farm. They can detect predators and alert the producer when predators enter the farmyard, and in some cases, can chase the predator away.

Electric fencing
Electric fencing of small pastures and corrals may help prevent predators from accessing young or vulnerable stock.

Lethal control
For coyote predation, contact a local agricultural fieldman for further advice on preventing losses and the possibility of using restricted poisons for coyote control. Restricted poisons are to be used only when all other avenues to stop predation have failed. Strict rules and legislation governs the use of these chemicals.

For wolf or bear predation, contact the local Fish and Wildlife office. Fish and Wildlife officers use culvert traps, foot snares or restricted poisons to control these animals.

Summary
There is no solution for preventing wildlife predation in all situations. However, adopting common sense management practices and appropriate producer vigilance will prevent livestock losses or at least keep them to a minimum.

8.4 Grasshoppers

Grasshoppers can be a major pest to cultivated and uncultivated crops. Semi-arid areas receiving less than 750 mm of precipitation per year are particularly susceptible. Traditionally, drier areas such as southern Alberta are more prone to recurring problems, but serious grasshopper infestations can occur in areas throughout the province.

Although grasshopper damage mostly affects cereal grains, other crops can be seriously affected. Even in a more diversified agricultural landscape, where cereal crops are often rotated with other crops such as canola, lentils and peas, grasshoppers continue to cause significant economic loss in Alberta.

Grasshoppers can consume 30 to 100 mg of plant material (dry weight) each day.

Forage losses are seldom estimated, but even a moderate infestation of 10 grasshoppers/square metre can consume up to 60 percent of the available forage, depending on the condition of the forage stand. The insects can also consume all of the forage crops, but they usually work the outer edges of fields.

The type and extent of crop damage will depend on the type of crop, crop vigour, the number of grasshoppers present, and whether or not adequate cultural and chemical controls are used.

8.4.1 Managing grasshoppers

Cultural control

Grazing management. Grazing management practices that continually remove most of the vegetative canopy and drought conditions that reduce herbage biomass production and plant density favour pest grasshopper species. These conditions allow population numbers to increase to problem levels. Increased solar radiation that reaches the soil surface and increased airflow over the ground result when the canopy is removed by overgrazing and/or drought. Removal of the canopy also decreases relative humidity and increases soil and air temperature. All of these factors favour pest grasshopper species. Higher temperatures hasten egg development, nymphal growth and maturation, as well as adult female egg production. Sunlight and low humidity also decrease the number of important grasshopper pathogens. Canopy removal can also affect basking sites, which allow for early morning warming, perching sites that provide an escape from mid-day high temperatures and preferred egg laying sites on bare patches of soil.

Cultural practices that can negatively affect grasshopper populations are those which increase live plant basal cover, decrease open areas in vegetative canopy cover and increase plant biomass. All of these practices will lower temperatures, increase relative humidity and reduce the amount of solar radiation in the grasshopper microhabitat. These changes have an adverse effect on egg development, nymphal growth and survival, and egg laying. They also encourage higher numbers of beneficial pathogens, which inhibit grasshopper survival, keeping grasshopper populations at lower levels.

Figure 8.1 Grasshopper

For example, to inhibit grasshopper populations, mow hay fields before the flowering stage. This stimulates tiller production, increasing basal cover and reducing areas of bare soil. This also produces higher quality hay with increased protein content. Light grazing in the spring is another way to stimulate tillering and achieve the same results.

Rotational grazing is another practice that encourages increased plant basal cover, thereby reducing bare patches of open ground. The increased amount of time between grazings allows plants more time for regrowth and decreases the amount of time the field is without a canopy. Grazing research in Montana and Idaho has shown that there were between 69 percent and 79 percent fewer grasshopper nymphs and between 71 percent and 96 percent fewer adult grasshoppers on twice-over rotation pastures than on season-long grazed pastures.

Chemical control

Insecticides. A number of insecticides are registered for grasshopper control in pastures and hayfields. Insecticides can be applied as sprays or baits, and both can be equally effective if used as directed. Insecticides are most effective when applied while the grasshoppers are still in the early instar stages. Food consumption by grasshoppers increases rapidly after the third instar. The most serious economic damage occurs when the insects are in the third to fifth nymphal stages; implement control measures prior to these stages to prevent economic damage to the crop. Also, as the hoppers approach adulthood, chemical control becomes increasingly difficult and higher rates are necessary. Read labels thoroughly before using any insecticide and observe safety and grazing restrictions. For a complete and up-to-date listing of registered insecticides and rates, consult Alberta Agriculture, Food and Rural Development's "Blue Book" publication, *Crop Protection* Agdex 606-1, which is updated annually.

Reduced agent area treatment (RAAT). This grasshopper control strategy was developed by researchers at the University of Wyoming. It is designed to reduce the amount of insecticide used and the area treated. Insecticide is applied at reduced rates in 30 metre passes alternating with 30 metre untreated passes. Higher rates and greater coverage may be necessary if infestations of later instars or adults occur. This innovative strategy is successful because grasshoppers move from untreated to treated areas. Natural biocontrol agents are preserved in the untreated areas. In a study done in southeastern Wyoming, a RAAT treatment was essentially indistinguishable from a standard blanket treatment; both treatments resulted in 80 to 90 percent grasshopper mortality.

Roadside vegetation management and barriers. Infestations of grasshoppers often begin at the field margins where grasshoppers move in from roadside ditches, treelines or fencelines. Controlling grasshoppers in these areas is an effective method to prevent infestation of a field. Most insecticidal sprays and baits are registered for this use. Use of insecticidal "barriers" around crops is more common in high value crops such as alfalfa. Close monitoring is required and multiple sprays may be necessary to achieve good results.

Biological control

There are three general biological control strategies: classic biological control, augmentative biological control and conservation of natural enemies. Biological control should not replace pesticides and other methods of control. It is meant to be combined or integrated with preventive, physical and chemical controls in an overall strategy or system of control for one or more pests. For example, timely tillage removes the green growth on summerfallow which starves newly hatched grasshoppers. This strategy can be used in combination with the disease-causing agent Nosema and the pesticide Furadan along the edges of the field. This combination of approaches will minimize grasshopper damage.

8.5 Pest Management Plans

The most effective method of pest and predator control is to remove their habitat and food source. For example, reducing broad-leafed weeds using integrated pest management removes a food source for gophers. Although this is effective for the target species (gophers), this strategy affects other non-target species as well; hence, the overall effect on the diversity of the general landscape becomes larger and more costly to the environment. Consideration must be given to the long-term health of the ecosystem when implementing a pest control program. Short-term strategies, such as limiting dandelions, thistles and clovers, may be reasonable for pocket gopher control because pocket gophers require broad-leafed plants for their energy needs. However, radical strategies, such as brush removal from riparian edges for beaver control, have more serious side effects.

Attracting natural predators to an area can reduce pest populations. For example, build nesting platforms to attract hawks and other birds of prey. Contact a local Alberta Fish and Wildlife Office for more information on habitat management for attracting natural predators.

- The most effective management of pests and predators integrates mechanical, biological and chemical controls.
- Understanding the life cycle and habits of the pest/predator is key.

8.5.1 Pest management considerations

Consider the following points when developing and implementing a pest management plan:

- Plan one to three years ahead, before land is converted into forage or cereal production in order to prevent immigration of field rodents. Create crop barriers using shrubs, perennial corridors or annual cropping/fallowing areas to discourage rodent invasion. Remove broad-leafed foliage from the periphery or within the planned crop area to significantly reduce the area's desirability to rodents.
- Use specific perennials that have a repelling effect on field rodent species; for example, castor bean plants repel rodents with reasonably good results.
- Treat the periphery of areas planned for cropping to remove initial invaders. Use traps to prevent/reduce invasion by pocket gophers, ground squirrels and possibly voles. Peripheral trapping eliminates the need to trap an entire cropping area later on.

8.6 For More Information

Contact the following offices for the publications listed or for more information.

Alberta Agriculture, Food and Rural Development (AAFRD)
Agriculture Information Centre 1-866-882-7677
Publications 1-800-292-5697
www.agric.gov.ab.ca

- *Controlling Wildlife Damage in Direct-Seeding* Agdex 519-16.
- *Control of Pocket Gophers and Ground Squirrels* Agdex 684-1.
- *Mice and their Control* Agdex 683.
- *Preventing Bird Damage to Prairie Crops* Agdex 685-4.
- *The Richardson's Ground Squirrel (Prairie Gopher): Its Importance and Control* Agdex FS684.
- *Physical Control of Pests.*
- *Starlings and their Control.*
- *Principles of Biological Control.*
- *Crop Protection* Agdex 606-1.
- *Grasshoppers: Life Cycle, Damage Assessment and Management Strategy* Agdex FS622-27.

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