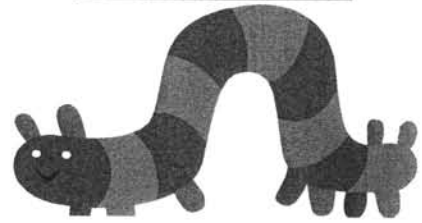


WHERE DO THEY GO FOR WINTER?

A summary of how some common arthropods survive Colorado winters.

Whitney Cranshaw
Colorado State University

INSECTS!



As cold weather moves into the state insects and mites undergo major changes to survive. Some species will die out over winter, those that annually recolonize the state with spring and summer migrations (e.g., aster leafhopper, potato psyllid, black cutworm). Others prepare in several different ways. Caterpillars and beetles tend to burrow into soil or other protective cover. Aphids produce cold-resistant eggs, that are attached to buds and needles. Several species like the protection that buildings and homes provide, producing seasonal nuisance problems.

Regardless, most species that successfully overwinter undergo physiological changes as well. Insects become "cold-hardy" at this time, which involves chemical changes, including the production of antifreeze, that protects their cells from lethal freezing. At this time, most insects are also in a condition known as *diapause*, a semi-dormant state where reproduction, development, and most feeding ceases. Diapause persists for months, and is only ended when certain environmental triggers are passed. Day length is sometimes used to determine when diapause occurs; a critical exposure to chilling temperatures may also be required to end diapause.

The following is a summary of how many arthropods in the state survive winter:

BUTTERFLIES

Most Colorado butterflies spend the winter as pupae, in sheltered corners often several yards from the plants on which that the caterpillar stage earlier fed. However, a few manage to tough it out as adult butterflies, notably the Mourning Cloak, which may even be sometimes seen flying during warm days in winter.

Several butterflies, including the Monarch, Painted Lady, and Variegated Fritillary, show true migration into the state during spring followed by a southern migration in late summer. The Monarch overwinters in the butterfly stage in a fairly restricted area in the highlands of Mexico.

HORNWORMS

Hornworms spend the winter in the pupal stage, in the soil buried several inches deep.

CUTWORMS

Cutworms typically spend the winter as small caterpillars which resume feeding and growing as young plants sprout in spring. A few cutworms overwinter as eggs, which hatch in early spring.

A few of the 'climbing cutworms', such as black cutworm and armyworm, can not survive Colorado winters, at least in parts of the state. Each year, new infestations arise from migrants flying into the state from southern areas.

ANTS

Ants are social insects that maintain a colony from year to year. Underground nesting is the norm, although some nest in wood or around homes. Overwintering stages are adults-both workers and

fertile queens. With warmer temperatures in late winter, eggs are laid and new ants are produced.

HONEY BEES

Honey bees are social insects that also maintain a colony from year to year. Almost all honey bee colonies are in maintained hives, although a few wild colonies occur in hollow trees, hollows of walls, and other protected sites. Overwintering stages are workers and a single queen. Egg laying is suspended in fall and begins to again during late winter.

YELLOWJACKETS/ HORNETS/PAPER WASPS

Yellowjackets and hornets are social insects that abandon the nest at the end of the season and start a new colony each spring. Overwintering stage is a fertilized queen which hides in protected sites such as under bark, around buildings, and other locations. In spring, surviving females attempt to individually establish a new colony, a project that is rarely successful. Colonies that do become established grow slowly during the early season, when the queen and a few worker wasps are available for colony chores. However, as the season progresses, colonies expand rapidly. At the very end of the season, queen and males are produced. By early fall, the colony is abandoned and the workers and males die.

BUMBLE BEES

Although bumble bees also are social insects they make new colony each year. The only stage that winters are the large, fertilized queens which hide in protected areas. In spring the queens emerge and try to establish a colony in abandoned rodent or bird nests or in hollows that have insulating material nearby. As the colony is originally produced solely by the efforts of the single queen the first workers produced are malnourished and small in size. However as these and later workers are produced to help with colony chores the colony becomes full-sized in late summer, before it is abandoned.

SAWFLIES

Most sawflies winter as a full-grown larva (pre-pupa) within a silken cocoon in the soil. Pupation occurs in late winter.

One sawfly, known as the bull pine sawfly, remains an active feeding larva through the winter and will feed during warm days.

LEAF BEETLES

Beetles that feed on leaves (potato beetles, asparagus beetles, elm leaf beetles, flea beetles) overwinter in the adult stage, often in the general vicinity of the plants on which they earlier fed.

LADY BEETLES

Lady beetles) overwinter in the adult stage, typically seeking protected locations (e.g, under clapboards, leaves, bark flaps) in the general vicinity of where they spent the summer. In particularly good sites, they often will winter in clusters. One species that recently established in the state, the multicolored Asian lady beetle, frequently winters in homes.

A few of the lady beetles may migrate long distances seeking winter shelter, including at least 2 species which fly to the

mountains and spend the winter under the snow at elevations typically above 9000 ft. These beetles often occur in spectacular aggregations which are most commonly observed during fall. The beetles then fly to lower elevations in late spring as snow melts. Mass winter aggregations occur all along the Front Range but apparently do not occur in western Colorado.

BORERS, GRUBS

Beetles which feed under ground or within plants (e.g. borers, grubs, bark beetles) typically spend the winter as larvae, which resume feeding in spring after temperatures warm.

APHIDS

Most aphids overwinter as eggs on some tree or shrubs. A typical Colorado aphid life cycle involves feeding on an herbaceous summer host plant followed by return of the aphid to a perennial plant in late summer and early fall. For example, green peach aphid is a common garden pest in Summer, but only survives winters on various *Prunus* spp.; potato aphid, another common garden habitant in Summer, survives as eggs on rose in the winter.

Some aphids, notably the Russian wheat aphid, overwinter on the plant on which they feed, continuing to feed and develop throughout winter as long as temperatures permit. Other aphids, such as the cotton aphid and greenbug, rarely survive Colorado winters and most found during the summer originate as annual migrants from more southern areas.

POTATO PSYLLID

Potato psyllid overwinters on native plants along the U.S.-Mexico border. Its occurrence in Colorado is based on annual migrations northward from these southern areas.

WHITEFLIES

Whiteflies are subtropical insects that can not survive outdoor winter conditions of Colorado. Populations of whiteflies are maintained season-to-season on indoor plants and in greenhouses. Infested transplants are the source of whitefly populations on garden plants.

BUGS

'True bugs' (Hemiptera, suborder Heteroptera), such as the squash bug, boxelder bug, conifer seed bug and various stink bugs typically spend the winter in the adult stage. Immature nymphs that get caught at season end and cannot develop to the adult stage due to lack of food or sufficient temperature, can not survive winter. Surviving insects occur in protected locations often around the plants on which they earlier fed. Some true bugs (boxelder bug, conifer seed bugs, rough stink bugs) commonly enter homes to seek shelter and are a nuisance pest.

A few plant bugs which feed on trees (honeylocust plant bug, ash plant bug) lay eggs on the tree during the growing season, which hatch in spring.

EARWIGS

Earwigs spend the winter in the adult stage. In very early spring the female digs out an egg chamber under a rock or other shelter and eggs are laid. The female tends the eggs and for several weeks caring for the newly hatched nymphs, an unusual behavior among

insects..

GRASSHOPPERS/CRICKETS

There are **a lot** of different grasshoppers in Colorado (60+ species), and the ways they make it through the winter also vary.

However, most of the damaging grasshoppers (certain *Melanoplus* spp., clearwinged grasshopper) and crickets overwinter as eggs, in an egg pod inserted into soil. Other species overwinter as adults and even nymphs.

MOSQUITOES

Most Colorado mosquitoes (floodwater types, such as *Aedes* species) spend the winter as eggs that were laid earlier around the edge of receding water.

Others may spend the winter as adults (*Culex* species), seeking protected sites such as caves, wall voids, animal burrows, etc. Certain *Culex* are involved in transmission of the West Nile virus.

FLIES

Many of the most common flies spend the winter in the adult stage. Often these flies enter buildings, where they may be observed to lazily fly about the room after they emerge from winter shelters. During the winter these flies are in a semi-dormant state known as **diapause** and do not feed nor reproduce. Increasing day length and temperatures 'reawaken' these flies to pursue normal activities in spring.

Other flies spend the winter as pupae, in soil.

GREEN LACEWINGS

Overwinter as pupae, in a silken case, usually attached to trees or other plants. At least one species, common to higher elevations, winters in the adult stage, often in homes.

DRAGONFLIES/ DAMSELFLIES

Dragonflies overwinter in water as nymphs. Most damselflies spend the winter as eggs, inserted into shoreline plants.

SPIDER MITES

Spider mites survive winter in various forms. Perhaps most common are dormant, mature females, that typically turn reddish or orange as they undergo winter diapause. Twospotted spider mite and honeylocust spider mite are examples. Overwintered mites spend the winter in scattered, protected locations around previously infested plants or around buds and bark scales of trees and shrubs.

Other spider mites survive as eggs. For some of the cooler season-adapted species (e.g., spruce spider mite) peak populations of the mites may occur in fall or spring, but extreme cold forces them into more resistant eggs. However, clover mites on lawns appear capable of continuously developing on lawn grasses throughout winter, so long as daily temperatures allow.

SPIDERS

It is hard to generalize about the overwintering habits of spiders as it can vary greatly. However, most of the orb-weaving spiders and other species that act as "passive hunters" and use a web to ensnare

prey winter as eggs that are produced at the end of the growing season. Conversely, many of the more active "hunting spiders", such as wolf spiders, may winter as nymphs, becoming full-grown in spring.

A few spiders are quite long-lived. Giant wolf spiders may survive 2-3 years and tarantulas a decade or more. These spend winter in protected retreats, such as burrows underground or under other hollows. Widow spiders also may sometimes live a second season in a protected location, although they usually die off in fall.

Spiders that have moved indoors, are adapted to indoor conditions, and have available food may survive and reproduce year round.