KONZA PRAIRIE BIOLOGICAL STATION

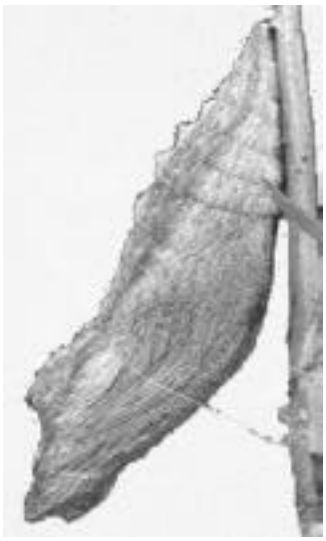
Tallgrass Gazette

Winter 2001

"The Newsletter for Docents and by Docents"

An Insect in Winter

Winter isn't a time we associate with insects. It is hard to look over a snow-swept field and imagine anything as delicate as a moth or a dragonfly surviving in the freezing cold and howling wind. But of course, the insects do not just disappear – they have their own strategies to withstand our coldest months, using their unique physiology, their small size, and their ability to go through different life stages to allow winter survival..



Swallowtail butterfly pupa

Take the butterflies for instance. A small number of butterflies are sufficiently strong fliers that they are able to migrate southwards to warmer climates in late summer. Most people are aware of the Monarch migrations, but other Kansas butterflies including Buckeyes, Painted Ladies, and Cloudless Sulfurs migrate southwards to Texas and Mexico in late Summer and Autumn. However, most butterflies are incapable of leaving for warmer climates and must somehow survive the cold of winter. These species enter a state known as diapause, during which the insects metabolism is lowered and the blood is filled with anti-freeze chemicals to prevent the formation of cell-damaging ice crystals. A number of common species, including Mourning Cloaks, Red Admirals, and all Angle Wings hibernate as adults in the leaf litter of deciduous forests. Not surprisingly, these species are among the first to take flight in the spring, often while there is still some snow on the ground.

Most butterfly and moth species are unable to enter diapause as adults and must overwinter in a more resistant life stage – usually as larva and pupa. Despite being strong fliers, almost all swallowtail butterflies are non-migratory and must pass the winter in the pupal form. These pupa can often be found in winter by searching the bare stems of bushes near to where the larval host plants grew and looking for the characteristic pupa suspended by two thin strands of silk.

While looking for Swallowtail pupa, keep an eye out for the cocoons of the Giant Silkworm Moths. These moths spin large (6–10 cm) cocoons of brown silk, often incorporating stray leaves into the cocoon structure. Typically, the cocoons will be located on the branches of trees and tall bushes, and can be easily found in winter once the leaves have dropped. The Polyphemus moth is probably the most commonly encountered member of giant silkworm moths in Kansas, but other species including the Cecropia moth, Luna moth and the Imperial moth have been reported from this state.

The other species of butterflies and moths are not as easily found in winter, as they will be well hidden under bark, in the ground cover, or in the soil. Some of these species, such as the Cabbage Whites, Spring Azures, and Silver-Spotted Skippers overwinter as pupas, while others including the Common Sulfur and the Cloudy Wing skipper overwinter as partially or fully-grown larva. The Wood Nymph is unusual in that newly hatched larva seek out overwintering sites, and don't begin feeding until the following spring.

Caddisfly larva

Caddisfly case of twigs

Not all insects spend the winter in diapause or migrate to warmer climates. However, to see those species of insects that still thrive during the winter months, you need to be prepared to get a little wet. Wherever there is free flowing water or ponds that do not freeze to the bottom, you are likely to find a host of aquatic insects, including the immature stages of dragonflies, mayflies, stone flies, and caddisflies, and both immature and adult water beetles and diving bugs. The caddisflies are probably the most striking of this assemblage, being famous for the cases of stones, sand or leaf debris tied together with silk which they use as mobile homes. Many of the smaller species have given up mobility and instead fix their shelters to rocks or underwater branches while catching food with silk nets. A few large predatory species have abandoned cases

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Prairie Patter

Dr. Valerie Wright, Education Coordinator

Fall and winter on Konza Prairie are often as busy and interesting as other seasons. We served about 700 people from September through November, not including Visitors' Day. About 480 of these were students of all ages. The youngest of these from Oak Grove Preschool got a close-up view of the bison in the corral just before round-up with **Wilton Thomas** and **Karen Rappaport**. **Gladys Treichel** observed.

The Boy Scouts of Troop #74 spent the morning of November 11 at Hokanson Homestead putting up bird houses. Last winter the pieces were cut out by the **Walker family** (**Wade Walker** - Hornaday Project) and the sixth grade at **Amanda Arnold Elementary** built the houses. There are nesting boxes for wrens, chickadees, bluebirds, flickers, wood ducks and barn owls. Most of these are placed along the Homestead Trail and near the OWLS wildlife observation lean-to. About half of them are up and the rest will be added later this winter. Key to this process was **Chod Hedinger**, docent and scout leader. It will be interesting to see what actually nests in these houses.

If you would be interested in joining a team of observers to keep data on these birdhouses, please contact me.

A big thanks to **Ted Hopkins** for organizing this year's grasshopper collection. We now have a great reference collection that can be used by students or researchers. For those of you interested, the wingless adult grasshoppers are now highlighted in a separate unit tray.

David Friss, the Grasshopper Man, and **Hoogy Hoogheim** were among the many helpers at the bison round-up. It was a windy, raw day with a flake of occasional snow but **Barb VanSlyke** and her mom warmed everyone up with gallons of chili and beds of brownies and cookies.

Essayists Win Konza Sweatshirts

Cindy Quinlin teaches at the K. S. Hauge Alternative Education Center in Junction City. Her two classes of science students came to Konza on September 20 and 21 to join the Grasshopper Inventory Project. Both groups did an excellent job taking data. They added a good number of pinned specimens to the collection with their names on the labels. The students were challenged to write an essay about their experience. The two best writers would receive a Konza sweatshirt for their efforts. **Alisha Wicks** and **Jonathan Rowe** were the winners. The following are some excerpts from their essays.

"The prairie is a really big community of tallgrass. What I mean is Turkeyfoot, Big bluestem, Switchgrass and other kinds of grass. ...The prairie has a lot of grasshoppers and did you know grasshoppers are herbivores which means they eat only plants. But some grasshoppers eat the dead of other grasshoppers! ...There are a lot of hills in the Konza Prairie. The hills are called the Flint Hills ...and are full of flint. In the Konza Prairie there are turkeys and goldenrod all over the place."
-Jonathan Rowe

"When we went to the Flint Hills Konza Prairie, I wasn't really all that excited. ...But when we got there I really started to get into it. ...After we saw the bison and the rock experiment we got to go catch our grasshoppers. ...As a class we caught an abundance of grasshoppers. When we went inside ...we were able to see the fat grasshopper that everyone was talking about. When I first saw a grasshopper I thought that there was only one kind ...but there are more than just one kind. And I've always thought that they ate meat and other insects, but they are only herbivores. In our community I've never really paid any attention to all the things around me. But now that I've had this class I notice the different kinds of grass, plants and insects. - Alisha Wicks

Got the Writing Bug?

The Tallgrass Gazette needs a writer and editor to regularly contribute stories and items of interest to docents. Curiosity about Konza a must. The job doesn't pay but the benefits are tremendous!

Contact Tawnya Ernst
at
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We encourage all our readers to contribute articles, photos, snippets or ideas for future issues.

Blades - a Tale of Glory

The prairies are dominated by grasses, and indeed almost a third of the earth is covered by grass. There are some 9,700 species of grass on earth. They occur on all continents from the Arctic to the Sub-Antarctic and are distributed over a wide range of habitats. They hold the hills and plains against the destructive forces of erosion by wind and water. They are important to us as grain, sugar, paper, pasture for livestock, spices, and oils. These and hundreds of other items of daily use are products of grasses. Grasses were the first plants to be cultivated as food, and most of the dozen or so crops that feed the world today are grasses. Although immensely common and tremendously important, this is a group of plants that is perhaps, least understood and least appreciated by the casual observer. What is a grass, and what distinguishes grasses from other plants?

Botanists classify groups of plants with similar characteristics into families. Grasses are members of the plant family Poaceae, one of many families of flowering plants. Their classification as flowering plants is noteworthy, as one of the common misconceptions about grasses is that they have no flowers. Grasses do have flowers, just as sunflowers and goldenrods and roses have flowers; the only difference is that they are small and inconspicuous, and differ slightly in structure. Unlike other flowering plants that produce showy, colorful and fragrant flowers which attract animal pollinators, the structure of a grass is adapted for pollination by the wind. The flowers of a grass are arranged on the stalks in two rows. Each of the tiny flowers, borne singly or in groups within this spikelet is enclosed within small scale-like structures called bracts. In addition to reproducing via flowers and seed, grasses may reproduce vegetatively, producing new shoots or tillers from horizontal creeping stems called stolons or rhizomes, or from a dense crown at the base of the plant.

Big Bluestem

In addition to their small inconspicuous flowers, grass plants are characterized by long narrow leaves with parallel veins. The stems are usually round and mainly hollow, except at the node, the point where the leaf is attached to the stem. The stems have joints, noticeable bulges where the leaves are attached. The base of the leaf wraps around the stem in a structure called the sheath. Thus, they contrast strongly with many other flowering plants that have broad leaves with branching veins that are attached to a stem by a small stalk or petiole.

Although the basic structure of the leaf, stem, and flowers are similar among grasses, different grass species vary considerably and can be recognized based on differences in the bracts surrounding the flowers, the ways in which flower spikelets are grouped into clusters or inflorescences, and the overall architecture or growth form of the entire plant. Growth form variation among grasses originates from the patterns of growth and development of new young shoots or tillers. In some species, many new tillers emerge directly from within the leaf sheaths at the base of the plant, producing a "bunchgrass" growth form. In others, extensive lateral growth of rhizomes or stolons produces new tillers at their tips, resulting in a widely spreading or "sodgrass" growth form.

In contrast to many other plants, the growing points or meristems of grasses are protected, located down low near the base of the plant, rather than at the tips of the stems and branches. Thus, if the plant is grazed by an animal or damaged, the growing points or buds remain unharmed and it can easily regrow. In addition, grasses maintain a large amount of roots and rhizomes belowground to store food reserves for regrowth. As a result, in some cases the stems and leaves we see aboveground comprises less than one-fifth of the weight of the entire grass plant. These two traits of grasses help explain their tremendous resiliency to aboveground damage, and their excellent adaptation to drought, fire, grazing, and mowing.

by Dr. Dave Harnett

Kansas Association for Conservation and Environmental Education

Environmental education is the keystone of the Konza docent program. For docents interested in learning more about environmental education the Kansas Association for Conservation and Environmental Education (KACEE) can provide a network of support.

Established in 1969 as a public/private partnership made up of representatives of governmental agencies and organizations (including the KPBS), KACEE is a non-profit organization with an interest in supporting environmental education.

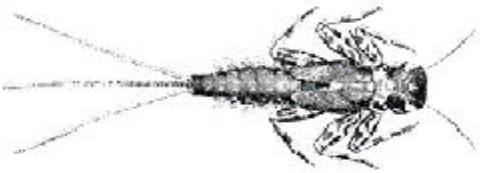
KACEE serves as a liaison for information exchange between member agencies and organizations involved with environmental and resource-use education.

A variety of environmental education workshops are offered to both formal and informal educators. These workshops include Project Learning Tree, Project WILD, Project WILD Aquatic, Project WET and Investigating Your Environment. KACEE acts as a co-sponsor of these programs in collaboration with various state agencies.

The environmental education materials encompass four core programs which provide professional development for teachers and nontraditional educators, as well as preservice enhancement for college students in education and natural resource disciplines.

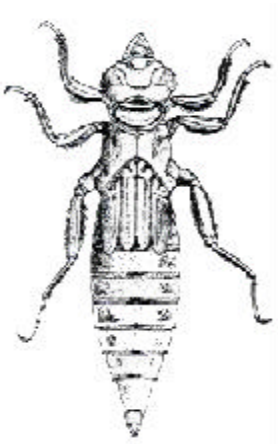
For general and membership informatiom, call 785-532-3322 or visit their excellent web site at www.KACEE.org.

entirely in order to freely roam for prey. The caddisflies themselves resemble caterpillars with gills, and not surprisingly, are a distant relative of the moths and butterflies. Adults resemble small, poorly flying moths with hairy wings and can often be found near water throughout the spring and summer months.



Mayfly larva

Anyone searching through pond debris or turning over stones in a stream are sure to come across the immature stages of mayflies and dragonflies. When most people think of mayflies, they think of their ephemeral adult lives, rarely lasting more then a day or two. The immature lives of mayflies are much longer, but as they occur underwater they are seldom noticed. The actual lifespan of a mayfly depends on whether they immature stage is spent in the summer or the winter – in warm water and with abundant food, some species can mature from egg to adult in as little as three weeks. During the winter, however, food is sparse and the cold water slows the metabolism, extending lifespans up to six or more months. The length of the immature stage of dragonflies and damselflies is similarly dependant on water temperature and food supply, and will vary from several months during the summer to almost a year if spent through the winter. A few species of dragonfly have relatively fixed immature lifespans and will spend two to three years in the water before emerging.



Dragonfly larva

Probably the most unusual of the winter insects are the winter craneflies and the snow fleas (not really a flea, but a member of the insect group Collembola), either of which can be found throughout the winter. The winter cranefly spends most of its life as a maggot feeding on rotting vegetation, but emerges as an adult during brief warm spells throughout the late winter and early spring in order to mate without fear of predation. Similarly, the snow flea emerges to feed on algae and spores trapped on the ice wherever the local microhabitat has become sufficiently warmed that the snow fleas can avoid freezing (usually around the base of trees). The dark colored bodies of the snow fleas help them to catch radiant heat from the sun and stay active despite the cold.

by Tom Clarke

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