



NATURALLY KENTUCKY

Number 19, July, August, September 1996

Those Beautiful Lady's-slippers

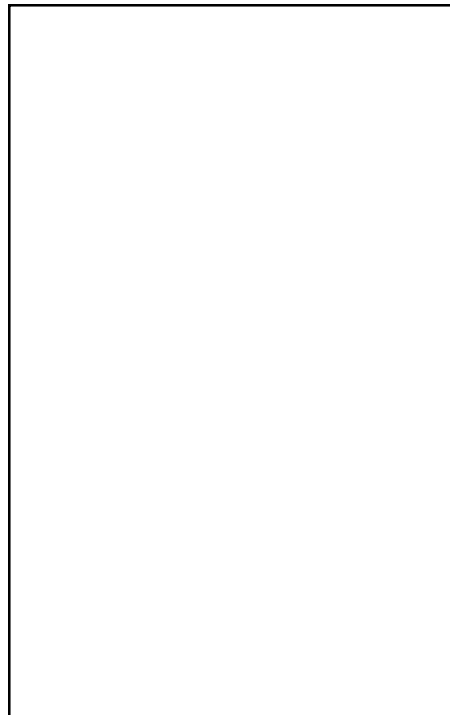
by Deborah White

Just a few weeks ago as I was roaming along the continuous green of a floodplain terrace, I saw one of the most complex and stately plants of the botanical world - the Kentucky lady's slipper. An overwhelming sense of the infinite complexity of the natural world came over me. I'm usually not this philosophical in the field, but there is something about these gorgeous plants that makes one stop and think.

Lady's-slippers are terrestrial orchids of the genus *Cypripedium*, a group that has some of the largest flowers of any orchid genus in the temperate regions. They are much sought after by horticulturalists but most have defied cultivation or make it extremely tedious. They cannot be successfully moved from the wild, the seeds do not respond to tissue culture or other germination methods and they absolutely will not survive in pots. Until the problems with cultivation are solved, it is best to avoid purchase of *Cypripedia* since most are gathered from the wild and will not survive. The plants are heavily collected, which is a major reason for their continued decline. They are protected from international trade by federal law,

and most states, Kentucky being an exception, prohibit their collection and sale.

Lady-slippers are all immediately recognizable by their formation of a large lip or pouch (a modified petal) that protrudes beyond two twirling petals. The elaborate



White lady's slipper

structures of these flowers are designed as a highly specialized insect trap. As insects are enticed into an opening in the pouch by powerful odors and light reflections, the patterns of the hairs allow escape only through two holes at the bottom of the flower. They cannot exit through the entrance and this forces them to

touch the stigma, the pollen receiver, and to pass under the pollen-bearing anthers on their way out. The sizes of these openings are selective for pollinator size, at least to exclude larger insects. Some trapped insects chew their way out if they cannot escape but, usually, the system works and helps to insure out-crossing. Various bee genera are the most common pollinators. Orchid pollination has fascinated scientists for more than a hundred years and even Charles Darwin wrote on "The Various Contrivances by which Orchids are Fertilized by Insects."

Five species of lady's-slipper orchids are known to occur in Kentucky. There is also a mysterious collection of showy lady's slipper (*Cypripedium reginae*) from central eastern Kentucky that has never been found again and is believed to be extirpated. A brief account of each species gives an appreciation of the diversity of colors, sizes, and habitats that are encompassed by lady's-slipper orchids in Kentucky.

Cypripedium candidum White lady's-slipper

This species is somewhat diminutive compared to its relatives but no less striking in appearance; the height is 1.5 to 4 dm and the flower lip (pouch) is about 1.5 to 2.2 cm long. The white pouch

Land Acquisition and Dedication Report

The land transfer of 326 acres of Kentenia State Forest from the Division of Forestry to KSNPC was completed at the end of May, and is now part of our Blanton Forest State Nature Preserve. KSNPC deeply appreciates the support we have received from the Division of Forestry and its Director, Mark Matuszewski. We will also soon acquire about 900 acres for an addition to Bad Branch State Nature Preserve; the land survey will start soon and we should own the land this year. Several other acquisitions and private dedications are underway, and we should have good things to report in the next newsletter!



Landowner Contact and Registry Report

KSNPC land protection specialist Landon McKinney resigned just after the last newsletter's deadline, and he has since moved to his home state of Tennessee to work as a botanist for our sister natural areas program, the Tennessee Division of Natural Heritage. Landon had worked both as an inventory botanist and for several years on landowner contact, land acquisition, and the natural areas registry program. For all the owners of registered natural areas, as soon as we fill this vacancy, we will be back in touch with you! We wish Landon every success down south!

Kentucky Biodiversity Council

The Kentucky Biodiversity Council, formed by Governor Brereton Jones in his last week in office, is the successor to the Biodiversity Task Force, and its creation was one of the recommendations of the Biodiversity Task Force. The council now consists of these seven individuals: Mr. Jeff Holman of East Kentucky Power Cooperative, Inc. in Winchester as Chairman, and members Fred Mudge, Secretary of the Transportation Cabinet, who is represented

by Steve Rice of the Division of Environmental Analysis; State Parks Commissioner Mary Ray Oaken; Department of Fish and Wildlife Resources Commissioner Tom Bennett; Division of Forestry Director Mark Matuszewski; Division of Conservation Director Steve Coleman; Kentucky Environmental Education Council Director Jane Wilson; KSNPC Director Robert McCance; and Dr. Larry Elliott, representing the Kentucky Academy of Science.

The council has met twice this year, and a committee of the

Kentucky Academy of Science has met to begin developing recommendations for the council. Initial discussions and presentations have dealt with the issues of data management and biological inventory status and needs. The efforts and recommendations of this council will have great impact on the conservation of biological diversity in Kentucky, and thus will influence the activities of KSNPC. Anyone desiring notification of their meetings can contact KSNPC. The council also will produce a semi-annual newsletter.

**From the Desk
of
Dot Marek
Commission Secretary**

Did you know that the Commission maintains its own on-site library? It's true! Not only is it used on a daily basis by our staff, it is available to our cooperators and the general public as well.



Our library contains more than 2,400 technical volumes in 56 different categories, soil surveys for nearly every county in the Commonwealth, educational video tapes and more than 50 different periodicals. We have more than 170 publications written by past and present Commission botanists and biologists. New publications are added each month by the Commission Librarian (yours truly) in an effort to keep current with the latest scientific materials available.

Most publications may be checked out for a period of one week and photocopies of specific articles can be made on our copier. The bibliographical information for each publication is stored on a database and in printout form in the library itself. Students and researchers are welcome to use our library during normal office hours

If you are seeking technical information regarding aquatic organisms, bats, birds, butterflies, flowers or forestry, land management or other types of natural features within the Commonwealth, please stop in and use our library.

New Faces at KSNPC

Two seasonal botanists, Bryce Fields and Pat Carroll have been hired to search for historical occurrences of rare plants and assist with other botanical studies. Bryce graduated in 1988 with an undergraduate degree in mathematics before pursuing a master's degree in biology at EKU. He is currently completing his thesis, the Vascular Flora of Blanton Forest. Pat received a B.S. in biology from Thomas More College. Recently, he finished his master's degree from WKU. His work at WKU was a multifaceted study of the genus *Hexastylis*.

Bryce Daniels and Matt Thomas have been hired to assist aquatic biologists with aquatic studies in various parts of the state. Bryce is currently attending Eastern Kentucky University majoring in Environmental Resources. Matt graduated from Morehead State University with a B.S. in Environmental Science.

Any Covert returns this summer, but this time assisting the data management staff in the processing of field data from

the past field season. Any will also assist staff biologists in field data collection.

Aissa Feldmann has been hired as an Environmental Biologist Senior to assist the community ecologist in field data collection. Aissa graduated from the University of Georgia with a M.S. in Conservation Ecology.

Pam Snyder has also been hired as an Environmental Biologist Senior to assist the Stewardship Staff in compiling information to refine management techniques. Pam graduated from Southern Illinois University with a M.S. in Forestry. Kristen Johnson and Jason McClure have also been hired to assist Stewardship Staff to conduct regular preserve maintenance. Kristen is currently attending Hocking College working on her M.S. degree in Forestry. Jason is attending the University of Kentucky studying Plant Biology.

Kyle Napier has been hired as a Nature Preserve Stewardship Assistant to inventory, patrol, and manage Blanton Forest and Pine Mountain. And last but not least, Robert Kiser is now on board as a Zoology Assistant conducting studies of terrestrial resources in various parts of the state.

We're glad to have these people on board!

Those Beautiful Lady's-slippers continued from page 1

contrasts with maroon-striped green petals and sepals. The most fascinating aspect of the biology of white lady s-slipper is its Kentucky habitat - limestone glades. These glades are extremely xeric, so dry that this is the primary mechanism for competitive exclusion in this habitat, and a seemingly unusual place to find a beautiful orchid. In the northern portion of the range for this plant, it is known from wet prairies. Because of its extreme rarity, white lady s-slipper is designated state endangered by KSNPC in the state.

***Cypripedium acaule* Pink lady s-slipper**

There is no mistaking the pink lady s-slipper. Not only does it have a large flower with a pink to magenta lip, it also characteristically has two leaves at the base of the stem and none others. This orchid is found in the eastern part of the state in the Cumberland Mountains and the Appalachian Plateaus regions. There is some potential for it elsewhere, so if you come upon it take a picture and please let me know! Its habitat is dry to mesic forests.

***Cypripedium kentuckiense* Kentucky Lady s-slipper**

Kentucky's namesake is one of the showiest and largest of the lady s-slippers occurring in the state. Despite its name, Kentucky lady s-slipper is also found in Tennessee, Arkansas, Oklahoma and Louisiana and it is considered

rare in each state. The species is widespread in Kentucky but its numbers are believed to be dwindling primarily due to collection and habitat loss. It



Kentucky Lady's-slipper

is monitored by KSNPC as a species of special concern. Kentucky lady s-slipper grows on stream terraces and moist slopes.

***Cypripedium parviflorum* Small Yellow Lady s-slipper**

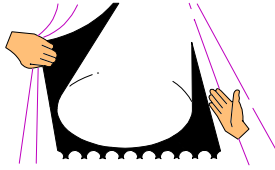
Small yellow lady s-slipper is the most controversial of the species in Kentucky and only recently has been recognized at the species level; it is sometimes treated as a variety of *Cypripedium calceolus*. To add to the confusion, the

plants hybridize with yellow lady s-slipper muddling the characters that distinguish these species. The plants have a yellow lip that is small, usually 2-3 cm in length. The petals are deep reddish-brown. It is found in low wet forests whereas yellow lady s-slipper is found in forests that are mesic or dry.

***Cypripedium pubescens* Yellow Lady s-slipper**

This species is part of a complex of related taxa that extends from Siberia across North America to Europe. Yellow lady s-slipper has the widest range of any other species in the country, extending across temperate North America. The large pouch is bright yellow with red specks within. The stem and leaves are characteristically pubescent or fine hairy and this is said to imitate the skin. This orchid is found in mesic to dry woods.

A few weeks ago I would have been the least likely person to write about lady s-slippers. I thought that they got a lot of attention so I focused on other less appreciated plants. But, the popularity of these plants is well-deserved. The population of Kentucky lady s-slipper I visited was very close to a road and I was amazed that they had not all been collected, surely local people know they are there. But maybe they felt the same awe that I felt—this is a beauty that should remain untouched.



NATURE PRESERVE SPOTLIGHT

Up from the Ashes--Restoration and Research of Raymond Athey Barrens State Nature Preserve

by Rick Remington

Prior to European settlement, south-central Kentucky was a mosaic of forested river bottoms, upland forests, prairies, and barrens. As settlement increased, these open prairies and barrens were the logical choice for conversion to the needed agricultural fields and pastures. What little remained quickly grew over with cedars and hardwoods as wildfires were suppressed. The native grasses and forbs dependent on fire and open growing conditions soon perished. Today, only a few fragmented areas remain as witness to this rare natural community. Raymond Athey Barrens in Logan County is one such area. Raymond Athey Barrens State Nature Preserve, named for the self-taught botanist who discovered the area, was established in 1990 and currently encompasses 160 acres.

Raymond Athey Barrens is characterized by open-grown post oak, blackjack oak, and red cedar in the canopy. The understory contains many forbs and grasses common to prairie areas as well as several rare plant species. Prairie gentian and rough rattlesnake-root are endangered in Kentucky, while Carolina larkspur, hairy fimbriatilis, and upland privet are threatened in the state. As fire has been suppressed, some areas of the preserve have become overgrown with cedars and hardwoods. Other portions of the preserve remain relatively open as a result of past agricultural practices. The preserve also contains several small limestone glades which are also rare communities in Kentucky.

Beginning in 1991, KSNPC began restoration of Athey Barrens with the manual removal of cedars. Prescribed fire was introduced in 1992. Fire has since eliminated some of the younger cedars and woody species providing the native grasses and forbs an open environment in which to

grow. Fire also helps eliminate exotic species and aids in native plant germination. This year's seasonal work crew will initiate a girdling project on some of the larger fire-resistant trees. Girdling, or cutting a wide ring through the bark of the tree; kills the tree while it remains standing. The project will begin with the expansion of some of the limestone glades to curb the encroachment of trees. The removal of the leafy canopy adds increased sunlight to the forest floor stimulating new grass and plant growth. The standing trees also dry leaving them susceptible to fire during subsequent prescribed burns. The result will be a canopy of large open grown trees with a grassy, prairie-like understory. Vegetative sampling will be done before and after girdling to determine its success.

In the spring of 1996, KSNPC began a joint project with Western Kentucky University (WKU). Dr. Michael Stokes of the WKU Biology Department is researching the effects of various prescribed fire methods on small mammal populations living in the grassland portions of the pre-

Continued on page 7

Caddisflies: weavers of silk

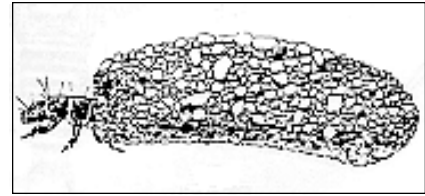
by Ellis L. Lauder milk

While strolling along a crystal-clear, boulder-strewn stream and gazing upward through the forest canopy, one often notices the passing of butterflies, moths, dragonflies, and caddisflies. Caddisflies? Yes caddisflies! Belonging to the insect order Trichoptera caddisflies are one of the largest groups of aquatic insects. In fact, they are so diverse that more than 1,350 species in 22 families are known from North America north of the Rio Grande. In Kentucky, approximately 200 species representing 19 families have been recorded, but there are certainly additional species yet to be discovered. One species, Helma's net-spinning caddisfly (*Cheumatopsyche helma*), has not been found in Kentucky since 1938, and is currently listed as historic by the KSNEC. A taxonomically undescribed caddisfly, *Manophylax* (= *Madeophylax*) sp., is listed as of special concern by the Commission. The latter is one of the few caddisfly species that has adapted to life out of the water where, in Kentucky, it lives on moist, sandstone outcrops in the Daniel Boone National Forest.

Caddisflies are holometabolous, meaning they go through a complete insect life cycle (i.e., egg, larva, pupa, adult). Except for a few species, the immature stages

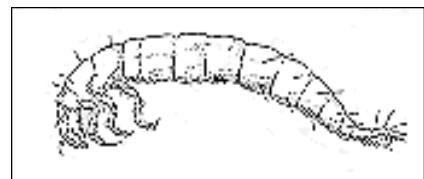
live in aquatic habitats of all types. After pupation, the adults live in a terrestrial environment where they mate and are an important food source for land-dwelling organisms, especially bats since most adult caddisflies are primarily active at night. Probably the most fascinating aspect of most larvae is their ability to construct nets, retreats, or portable cases which are used for food capture, protection, and respiration. Silk is emitted through an opening at the tip of the lower lip during case construction to fasten rock fragments or plant materials together, or to construct nets and retreats in those species that do not make cases.

North American families have been categorized into five natural groups on the basis of the type of net, retreat, or case constructed, and on the ecological roles that the larvae occupy in the aquatic community: (1) **free-living forms** — as the name suggests, this group does not construct a retreat or case of any kind until just before pupation when a crude cell of rock fragments is usually fastened to a larger rock. Traveling light has its advantages if you are a predator as are most species in this group; (2) **saddle-case makers** — larvae in this group utilize rock fragments to construct cases which resemble tortoise shells. The top of the larva is covered by its dome-shaped case, and freshly aerated water enters the case through tiny spaces between rock pieces; (3) **purse-case makers** — larvae are



Ochrotrichia sp..

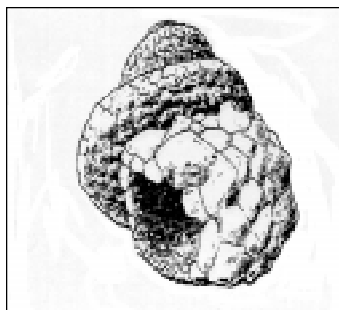
very small and free-living until the final instar (last stage before pupation) when they construct purse or barrel-shaped cases out of silk, often using sand grains and algae; (4) **net-spinners or retreat makers** — most larvae of this group could be categorized as "couch potatoes" because of their sedentary nature and desire to have food delivered to them by the current. They construct fixed retreats out of silk, or organic and mineral fragments, often with capture nets which are used to strain food particles from running



Polycentropus sp..

water, or in some cases, wave swept shorelines. Interestingly, the mesh size of the net provides an excellent clue to the habitat the larvae occupy. Those living in fast current, typically the headwater areas of streams, construct nets with a larger mesh size which prevents the net from being ripped

apart by the strong currents. They feed primarily on other insects trapped in their nets. Those constructing nets with a small mesh size filter small particles of food and live in downstream sites where the current is slower; and (5) **tube-case makers** — most families are classified in this group. Larvae construct essentially tubular-shaped, portable cases of various shapes and materials including sand



Helicopsyche borealis .

grains, tiny pebbles, pieces of leaves, sticks, etc. The cases not only provide protection, convenience of being portable, but also enhance respiration through the passage of water over the gills during undulating movements by the larvae. Studies indicate that larvae remove more oxygen and live longer at low oxygen levels within their cases.

Because of their diversity and ecological roles in aquatic ecosystems, caddisflies are very important components of food webs, and Kentucky's rich natural heritage. The larvae are favorite food for other insects and several groups of fishes, such as minnows and darters, and are excellent indicators of water quality. In fact, studies have shown

that trichopterans are the second-most sensitive (stoneflies or plecopterans are the most sensitive) aquatic insect group to water pollution. In other words, an abundance of caddisfly individuals and species in a stream indicates high water quality. On the other hand, a lack of individuals and species indicates that the stream has been degraded to some degree.

If you would like to see a living example of such important members of an aquatic community, take a trip to a small, nearby stream. Since caddisflies are most easily observed in the larval stage, examine the bottom of several medium-sized rocks (6-12 inches in diameter is a good size), especially in cracks and crevices. Undoubtedly your efforts will be rewarded by one or more of the caddisfly nets, retreats, or cases described above (and many other interesting insects). Look carefully at the rock and into a case opening, or place a case in a jar of clear water from the stream to invite an appearance by its fascinating inhabitant!



KSNPC Quarterly Commission Meeting

WHEN: September 13, 1996
WHERE: Shakertown,
 Harrodsburg, KY
TIME: 10:00 a.m.

Nature Preserve Spotlight Up from the Ashes--Restoration and Research of Raymond Athy Barrens SNP Continued from page 5

serve. Units, burned by KSNPC staff; include small checkerboards burned biennially, two large units burned biennially, and one large unit burned annually. The mammals will be sampled before and after the fires to study their recolonization patterns. At the same time, vegetation will be sampled to record its response to the various fire frequencies. The results of this study will help us determine the best size and frequency of burns during our restoration efforts at Raymond Athy Barrens.

The project represents a new working relationship between KSNPC and WKU students and faculty. The site provides a unique outdoor laboratory for the University and the Commission gains valuable information about the preserve and its ecology. The success of this study should provide a strong foundation for future studies and a mutually beneficial relationship for all parties involved. WKU's research grant is currently scheduled to last two years with a possible extension of the project.

KSNPC Celebrates 20 Years!

Several field trips to various state nature preserves have already been conducted in celebration of KSNPC's 20 years of protecting Kentucky's best natural areas. If you missed signing up for one and would still like to see a state nature preserve, there are still three to choose from.

Raymond Athey Barrens SNP Logan County - September 7 10:00 a.m. - 12 noon (central)

See barrens restoration and early fall wildflowers with KSNPC Western Regional Nature Preserves Manager, Rick Remington. Limit 15; moderate hike.

Vernon Douglas SNP Hardin County - September 28 (night hike)

8:00 p.m. - 10:00 p.m. (eastern)

Go on an owl prowling with Eastern Regional Nature Preserves Manager, David Skinner. Hikers may see glow worms and other types of wildlife. No flashlights please. Limit 20; moderate/difficult hike. Not appropriate for small children.

Vernon Douglas SNP Hardin County - October 12 8:00 a.m. - 12 noon (eastern)

Join KSNPC's Terrestrial Biologist, Brainard Palmer-Ball in search of fall songbird migrants. Limit 20; difficult hike rating.

Tours are limited and reservations will be taken on a first come, first-served basis. Contact Teresa Prather at 502/573-2886 for reservations.

Field Trip Ratings:

easy - Hiking short distances on trails with little or no slope.

moderate - Generally east with a comfortable pace. Must be able to negotiate occasional steep slope or rough trail.

difficult - More endurance required to negotiate longer distances and longer stretches of steep slopes and rough trail.

strenuous - Long hike, brisk pace, sometimes off-trail, steep slopes and/or steps involved.

*An Equal Opportunity
Employer M/F/H*

Kentucky State Nature Preserves Commission

801 Schenkel Lane, Frankfort, KY 40601
Tel. (502)573-2886 Fax (502)573-2355
office@msmail.state.ky.us

Director

Robert J. McCance, Jr.

Staff

Joyce Bender
Ronald Cicerello
Tim Clarke
Michelle Clendenin
Amy Covert
Marc Evans
Aissa Feldmann
Martina Hines
Ellis Lauder milk
Dot Marek
Brad Nyholm
Brainard Palmer-Ball
Teresa Prather
Rick Remington
Melissa Richey
Dan Russell
David Skinner
Pam Snyder
Deborah White

Commissioners

Judith McCandless, Chair
Kenneth Jackson, Secretary
Lucy A. Breathitt
O.D. Hawkins
Edwin Sutton

The Natural Resources and Environmental Protection Cabinet does not discriminate on the basis of race, color, national origin, sex, age, religion, or disability and provides, upon request, reasonable accommodations including auxiliary aids and services necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities.

It is the mission of the Kentucky State Nature Preserves Commission to protect Kentucky's natural heritage by: (1) identifying, acquiring, and managing natural areas that represent the best known occurrences of rare native species, natural communities, and significant natural features in a statewide nature preserves system; (2) working with others to protect biological diversity; and (3) educating Kentuckians as to the value and purpose of nature preserves and biodiversity conservation.

Commonwealth of Kentucky

Kentucky State Nature Preserves Commission

801 Schenkel Lane, Frankfort, KY 40601

**Bulk Rate
US Postage
Paid
Frankfort, KY
Permit #379**

Printed with state funds on recycled paper