The Lady-Slipper

Kentucky Native Plant Society | Number 15:4 | Early Winter 2000

An Overview of Invasive Pest Plants in Kentucky

The Ecology of Invasive Plants and Their Impacts on Native Ecosystems

by Robert Paratley

As long as humans have moved from place to place and have manipulated landscapes, they have introduced plants to areas outside their original ranges. Although there are numerous records of natural trans-oceanic migrations of plants (Sauer, 1988), usually humans are implicated in such long distance movement. Weeds of pasture and cropland have long been associated with human activity. When Europeans settled North America, they brought their plants with them, both purposefully and inadvertently. Many of these North American introductions were not even native to the European countries of the colonists, but were brought in turn to England, France, the Netherlands and other colonizing countries from the Mediterranean region, Africa, the Near East and even the Far East. These plants have a long history following the movements and trade routes of humans. Examples of intended introductions historically have included food and orchard crops, livestock forage, fabric plants, spices and medicinals. Colonists also brought favorite ornamental garden plants, although the wide-scale movement of landscape ornamentals really didn't begin until the 19th century (Heywood, 1989). In the 20th century, plants have been introduced to North America on a wide scale for erosion control on abandoned land, or for large scale revegetation projects following mining and road building.

People unwittingly brought non-native plants to America in the potting soil of the plants they brought, mixed with their crop seeds, in their clothing and personal articles, and in the fur and feathers of their animals (Baker, 1986). A very common method of accidental introduction in the 17th through 19th centuries was through ship ballast dumped in and around harbors to make room for transported American goods carried back to Europe. This ballast contained untold numbers of plant seeds of European and Asian origin (Pimentel, 1986). In the twentieth century, the movement of goods and humans across the globe on an unprecedented scale has resulted in numerous unwanted and unpredicted

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Wanted: KNPS Members to Plan Native Herb and Invasive Plant Initiatives

by Wilson Francis, KNPS President

At a summer brainstorming session of the KNPS Executive Board it was suggested that we should become more involved in increasing public awareness of the dangers of over collecting medicinal plants such as ginseng and goldenseal in Kentucky. The last issue of *The Lady-Slipper* was a first step toward defining such a role for the KNPS.

Most of us are also aware that some of the plants introduced into our natural communities from Europe and Asia are rapidly displacing native species. Here again, the KNPS can help bring this issue to the attention of the public. This issue of the newsletter is a start toward that goal.

In the meantime, the Executive Board is looking for members to serve on the Conservation and Special Projects Committee *which will look into these issues and advise the Board on how the KNPS should proceed. If you would be willing to help, please contact:*

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In this Issue—

The KNPS Web Site is at
http://sac.uky.edu/~mthom0/KNPS/knps.htm
(Use Capitals and lower case as shown, and that's a zero, not a capital o.)

The Lady-Slipper

is intended to be published by the Kentucky Native Plant Society [IRC 501(c)(3)] in Feb., May, Aug., and Nov. with deadlines the 1st of the prior months. Members of the Editorial Committee welcome submissions at all times.

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. . . . . AN OVERVIEW OF INVASIVE

Ecology of Invasive Plants & Impacts on Native Ecosystems (Cont.)

introductions of non-native plants on a world-wide scale. Many non-natives still find their way into new regions as hitchhikers and stowaways in spite of import regulations and quarantines. They have created numerous economic impacts for agriculture, ranching, and forestry, as well as impacts on the ecosystems that support these activities. These plants have also impacted the diversity and function of natural ecosystems, and it is these impacts which form the bulk of this article.

The terms weed, non-native plant and invasive plant are sometimes used loosely and interchangeably, but actually refer to three different but overlapping concepts. A weed refers to any plant which is growing where it is not wanted or otherwise interferes with human purpose. It often possesses (from the human perspective) undesirable qualities, such as unaesthetic growth form, spines or other tactile unpleasantries, or toxicity to humans or their animals.

Ecologists have a different notion of weediness, referring not to human needs but to life history characteristics of the plant itself. They consider a plant a weed when it shows the capacity to rapidly colonize and exploit open, disturbed habitats. Usually their domination of an ecosystem is relatively brief, as more competitive, longer-lived plants outgrow and outlast them in the normal course of vegetative succession.

Weedy plants possess such reproductive characteristics as rapid maturation, prolific seed production, and seed set under a wide variety of conditions rather than depending on specific environmental cues. Their seeds are usually adapted to long-distance dispersal by wind (small and light seeds, often with aerodynamic lift), water (with air pockets for buoyancy), or animal (with hooks or barbs to adhere to fur, feathers or feet) (Bazzaz, 1986). Many also have the capacity to delay seed germination for years in soil, forming a buried seed bank awaiting favorable conditions (Pimentel, 1986). Weeds usually perform well under the hot, high-light, and often compacted soil conditions of frequently disturbed habitats (Rejmanek, 1995).

A non-native plant is simply one occurring in a region outside its historic geographic range, usually taken to be its post Ice Age (Holocene) range. In most cases, the original range of a plant is reasonably clear, but sometimes early historical records of a plant's occurrence in more than one region (or continent) can create a muddled picture. This occasions numerous debates about the original ranges of certain plants, and, because of scant concrete evidence, it is often difficult to understand the exact timing of past plant movements (Heywood, 1989).

Poa pratensis, Kentucky bluegrass, is an example of a plant whose native status in Kentucky is not known. It is found in the early records of settlers here, and it is not known whether it was growing here already or was brought to the East Coast with first European contact in the 17th century and rapidly spread inland ahead of the westward movement of settlers (Wharton and Barbour, 1991).

Most non-native plants do not seed out and establish viable populations beyond the area in which they are planted. Some will spread occasionally (estimated to be less than 10% of all introductions), with the odd individual found escaped into neighboring landscapes, but the species will not establish viable populations outside its original planting area. A few may succeed in establishing such self-perpetuating populations (about 2% of all introductions), usually in nearby human-disturbed habitat, but will have little overall impact in their new home (Kowarick, 1995).

An invasive plant, however, is one which has gone well beyond the establishment of viable outpost populations to the point where it is explosively increasing its numbers and expanding its geographical range into locales and ecosystems where it previously was not found. It usually possesses most of the ecological characteristics of weeds described above. But clearly many weeds are not invasive (or non-native, for that matter). Many, especially ones introduced early in European settlement of North America, now have rather stable geographic ranges and show little tendency to encroach on natural ecosystems. A number, however, especially more recent introductions, begin to demonstrate invasive tendencies. Some invaders remain restricted to habitats heavily modified by humans as they move

PEST PLANTS IN KENTUCKY (Cont.) . . . . . .

across their adopted country; others succeed in invading native ecosystems. There is clearly more to the story than weedy characteristics.

WHAT CAUSES A PARTICULAR PLANT TO BECOME INVASIVE in a new land? Because plant invasions are rarely if ever documented from the point of introduction, thorough investigations of the phenomenon from its inception are almost impossible to undertake. Answers are therefore speculative.

Many plants successful at invading natural habitats are either somewhat shade-tolerant or at least capable of taking advantage of disturbances within natural landscapes. Many invasive shrubs fall into this category. They often manage to exploit animal seed-dispersers, thereby moving quickly through a landscape and perhaps achieving some long-distance dispersal by this means (Pysek, Prach and Smilauer, 1995). The most serious invasive plants are also excellent competitors. This means that they excel at garnering resources from their environment, turning these resources rapidly into new plant tissue, and therefore maintaining rapid height growth and lateral expansion both aboveground and in the rooting zone (Bazzaz, 1986). They also often employ vegetative reproduction, which consists of producing new potentially independent plants from the same genetic individual without benefit of seed production. This is accomplished through sprouts, runners, underground stems, or fragmented plant parts. Terrestrial invaders often produce large clones or sprout back vigorously after disturbance (Pimentel, 1986). Aquatic invaders are usually aggressive vegetative reproducers, and can rapidly choke waterways without ever setting seed (Ashton and Mitchell, 1989).

Most plants introduced in a new land leave behind the array of predators and pathogens which tend to keep their populations in check in their original ranges. It is easy to imagine an immigrant suddenly freed from the ravages of a seed predator or an infecting root fungus which kept things in balance in the original homeland. It can then establish a runaway population in its new range. But, again, most non-natives don't behave this way, so there must certainly more to the story than escaping an old nemesis. Most non-natives, in fact, undoubtedly acquire new sets of pests in their new homes which keep their newly established populations in check (Mack, 1995).

Further, there are many records, particularly from Europe, where repeated introduction of a "foreigner" fails to produce a problem, and, finally, a later introduction of the same species results in invasion (Kowarik, 1995). Certainly most non-native species establish viable outpost populations in small numbers initially, even if they were originally planted or seeded in larger numbers. The vagaries of the environment is usually very hard on small populations. Hence, most initial establishments may fail simply because of the unusually harsh winter, very dry summer, late spring frost, or other environmental extreme (Mack, 1995). But occasionally, a series of favorable years will allow the newly established plant to take off. Once larger, more widespread populations are established, the invader may be "environment-proof" and on its way to becoming a problem.

Part of the answer may lie in the extent to which human land manipulation and disturbance of native North American ecosystems has so markedly increased in the last two centuries. Most closed natural ecosystems are difficult to invade. Disturbance creates openings, lowering a system's "resistance" to invasion, creating opportunities for invasion by reducing competition among organisms and favoring plants with just the sorts of characteristics (i.e.—aggressive reproduction, rapid growth rates) possessed by many potential invaders (Elton, 1958). Animal introductions, in particular, are very good at opening up vegetation through destructive foraging or grazing (i.e. feral pigs, cattle) and may explain some cases of explosive invasion (Anderson, 1995).

Invasive plants can become quite prevalent in areas in which they establish themselves, and, in the worst cases, can literally overwhelm a habitat to drastically alter the composition of the plant community, exclude native species, and alter ecosystem function (Kowarick, 1995). They therefore often have dramatic and costly consequences. In agricultural and other managed systems, they usurp space and resources and can markedly reduce productivity

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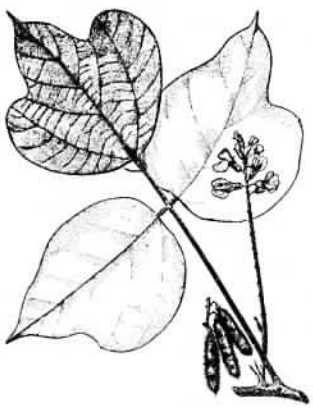
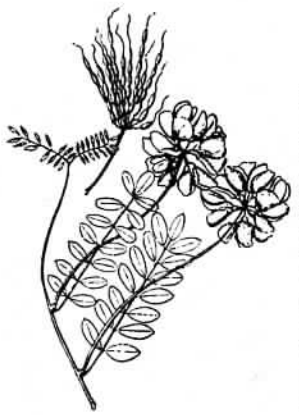


Legumes for Erosion Control & Wildlife, UDSA, 1941

Kudzu

Common Weeds of the United States, USDA, 1971

Multiflora Rose



Legumes for Erosion Control & Wildlife, UDSA, 1941

Crown Vetch

Illus. Flora of the N. United States..., Britton & Brown, 1913

Nodding Thistle

AN OVERVIEW OF INVASIVE

The Ecology of Invasive Plants and Their Impacts on Native Ecosystems (Contined)

and yield (Pimentel, 1986). The economic cost of weed control is of course enormous.

But managers of natural areas—public forest and rangeland, nature preserves, wildlife refuges—have also had to deal with the rapidly escalating problem of invasive plants. What difference does it make to an ecosystem if a new species is added? If only small numbers are maintained and the population is stable over time, it probably makes very little difference. But if a plant becomes invasive, the consequences can be very serious. Exploding populations of invaders can outcompete native vegetation, seriously and permanently altering the species composition of the habitat. Aggressive invaders may threaten the survival of endangered species, jeopardizing protective efforts by land stewards. Such encroachment also affects wildlife management. Often, when natives are crowded out, there are serious repercussions felt by wildlife populations depending on the natives for food or shelter (Vitousek, 1990).

Ecosystem function can also be altered, perhaps permanently, by invasive plants. Several examples illustrate the problem. Salt-cedar (*Tamarix*), a willow-like small tree which has invaded large sections of the arid American West, uses and transpires tremendous quantities of water in its life-processes because it roots directly into stream channels or ground water. It has permanently altered the hydrology of already water-stressed ecosystems and eliminated native vegetation along miles of Western riparian corridors (Brock, 1994).

Sometimes invaders, often woody shrubs or grasses, alter the fire ecology of a system by providing greater or very persistent fuel loads, or by adding extremely flammable fuel, which causes a system to burn more frequently or catastrophically than it had in the past. This may eliminate natives not adapted to more frequent or more calamitous fires (D'Antonio and Vitousek, 1992).

Invasive plants can alter the nutrient availability of the soils they invade. Ice-plant (*Mesembryanthemum crystallinum*), a succulent perennial herb, has invaded coastal grasslands of California. It concentrates salts in its tissues, and when these tissues are dropped as litter the result is to significantly reduce soil fertility and endanger numerous native plants ill-suited to the increasing soil salinity (Vivrette and Muller, 1977). Other cases of reduction in soil fertility through massive production of low-quality leaf litter have also been documented, as for instance through the invasion of exotic pines into eucalyptus forests in Australia (Chilvers and Burdon, 1983).

Forest tree regeneration can be seriously disrupted by the creation of an extensive understory of dense invading shrubs or by the blanketing of an area with a dense viney cover. Two important Kentucky invaders provide examples of this—bush honeysuckle (*Lonicera maackii*) (Luken and Thieret, 1995) and the infamous kudzu (*Pueraria lobata*), "the vine that ate the south" (Blackwell, 1974–75).

THESE TWO PLANTS MAY SERVE as an introduction to a "rogue's gallery" of problematic invaders to Kentucky landscapes. Bush honeysuckle, usually a large shrub or small tree, is native to the Far East and was introduced to the eastern U.S. near the end of the 19th century as an ornamental. It is an aggressive invader of both open habitats and disturbed forests, and has become a major problem in central Kentucky. Because of its rapid growth and very early leaf-out, it reduces species diversity in the ground layer as well as negatively affecting tree reproduction. Mechanical removal is difficult once the species becomes established, hampered by prolific sprouting and reseeding in areas disturbed by uprooting.

A close relative, Japanese honeysuckle (*Lonicera japonica*) is an aggressive vine which is also native to the Far East. It was introduced as a landscape element in 1806 in New York, and has spread throughout the eastern U.S. Like its shrubby cousin, it is easily spread by birds eating the fruit and passing the seeds. It grows rapidly and overtops and smothers native shrubs and small trees. Again, pulling, mowing, or burning usually succeed in stimulating regrowth (Nuzzo, 1996).

Kudzu also originates in the Far East, and was introduced

The Plant Kingdom Compendium, Jim Harter, 1988

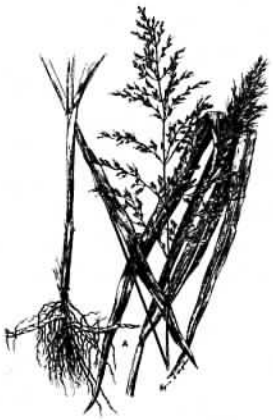
Poison Hemlock

Illus. Flora of the N. United States..., Britton & Brown, 1913

Garlic Mustard

Common Weeds of the United States, USDA, 1971

Bromegrass



Common Weeds of the United States, USDA, 1971

Johnsongrass

Pest Plants in Kentucky (Cont.)

as a horticultural plant in 1876. It became moderately popular as a porch vine and as forage for cows, but only became a pervasive invader of Southern lands after a 1930s program to widely plant the vine throughout the South as a way to prevent soil loss on bare lands. By the 1950s it was clear that this recommendation was a serious mistake—the rapid spread of kudzu had become a major headache for land managers in the Southeast. Kudzu is reported to grow up to 100 feet per year, and will spread up and over trees, blanketing and smothering them (Haragan, 1991). Today some 2 million acres of the South are covered by kudzu, and probably the only thing preventing even more rapid spread is the fact that the vine dies back with the freezes of fall. Kudzu has impacted much land in eastern and far western Kentucky.

Unfortunately, the lesson of kudzu goes unheeded today. Many plants are still used as erosion control which are spreading into native ecosystems creating many of the same problems. Such plants as autumn olive (*Elaeagnus umbellata*) and Russian olive (*Elaeagnus angustifolia*), princess-tree (*Paulownia tomentosa*), multiflora rose (*Rosa multiflora*), and crown vetch (*Coronilla varia*) are still being recommended for soil bank plantings and reclamation projects, and all are serious and aggressive pests in many areas. Sadly, one public agency's recommended solution is another's management problem.

Another problem is that a number of invaders have favorable aesthetic qualities and are therefore well liked by the general public, and, in a few instances, are still offered for sale in garden catalogs. An example is purple loosestrife, (*Lythrum salicaria*), an introduction from Eurasia. This vigorous perennial herb has rapidly taken over thousands of acres of northeastern wetlands, usurping native vegetation and devaluing habitat for waterfowl. To those unaware of the threat it poses, it makes a very appealing garden element and is admired by interstate motorists who view its midsummer magenta blossoms blanketing the wetlands it has taken over. This plant has already invaded some Kentucky wetlands, and land managers are concerned about its potential spread through the state.

Some important Kentucky invaders are not so appealing. Musk thistle (*Carduus nutans*) is listed as one of the most troublesome weeds in the state. This robust biennial with pink flower heads first appeared in the 1940s and has rapidly spread throughout the state's roadsides, pastures and fields. All parts of the plant are sharply spine-tipped, making it a nuisance both for grazers and humans with whom it comes into contact (Haragan, 1991).

Another serious pest is poison hemlock (*Conium maculatum*), a tall biennial with a purple-spotted stem, lacy fern-like leaves, and a flat-topped, white inflorescence . All parts of this plant are deadly poisonous to ingest, making it a potentially serious health and agricultural problem. Poison hemlock has also spread throughout the state, especially in limestone areas.

NON-NATIVE PLANT SPECIES will continue to be moved from place to place throughout the world; the problem of controlling invasive species will continue to plague humankind. Obviously prevention is easier and less costly than attempting a cure. Keeping unwanted non-natives out through restrictive entrance, port-of-entry laws, and quarantine is the best way to control potential future problems. Early eradication of newly established plants is far more cost-effective than trying to control a plant which is already out of control.

The problem, of course, is anticipation and detection before things get out of hand. Modern database technology is an important new tool to pinpoint new establishments and recent spread of species, and the level of detail available is such that many new introductions can be contained in the early stages (Cronk, 1995). Land managers are much more aware of potential trouble plants and are ever on the lookout for newly established pests. Public awareness will be critical in the coming years—stopping the sale of invasives to gardeners (purple loosestrife) or their use in land reclamation (autumn-olive; princess-tree) are important steps in the right direction.

Once an invader has spread widely, it can prove nearly impossible to control, much less eradicate. Herbicide treatments may be effective locally, but wholesale spraying of large areas is a dubious solution at best, with no guarantee of success. Biological control through introducing a predator or pest is risky and requires careful research. There have been occasional remarkable stories of successfully arresting an explosively invasive plant with an introduced biological control, but for every such success there are numerous other costly programs ending in frustration and failure.

A third serious pest throughout the state, garlic mustard (*Alliaria petiolata*), will easily penetrate open forested habitat. Another biennial, with a cluster of white, four-parted flowers, garlic mustard poses a special problem for the state's nature preserves containing rare species in the ground vegetation. It spreads rapidly into woodland openings and aggressively outcompetes native vegetation. Controlling this pest is a major stewardship undertaking for agencies which manage such preserves (Kentucky State Nature Preserves Commission; The Nature Conservancy), and control has been affected through no small effort by a combination of mechanical pulling, herbicide, and autumn burning (Shea, 1996).

Grasses are often well-suited to the role of invasive plant. They have long been associated with humans and their manipulated landscapes, and often possess sets of characteristics (rapid seed set, vegetative reproduction by tillering, resprouting after disturbance) making them ideal invaders (Heywood, 1989). Kentucky certainly has its share of invasive grasses. Traditional pests of pastureland such as bromegrass (*Bromus secalinus*) and Johnsongrass (*Sorghum halapense*) have been recently joined by Japanese stiltgrass,

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(*Microstegium vimineum*), an invader of open wood, thickets and trailsides. Like garlic mustard, this grass is causing land stewards in the state much concern due to its similar impacts on natural systems.

A slightly different version of this article appeared in the UK College of Agriculture Dept. of Forestry's Natural Resources Newsletter, *vol. 14, no. 4, 1998. It is reprinted here with permission.*

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The Kentucky Exotic Pest Plant Council

by Joyce Bender

The Kentucky Exotic Pest Plant Council (KY EPPC) was established this year as a chapter of the Southeast Exotic Pest Plant Council (SE EPPC). The goals of the KY EPPC mirror those of the regional organization: 1) to raise awareness and promote public understanding regarding the threat posed by invasive exotic pest plants to native plant communities in Kentucky; 2) to facilitate the exchange of information concerning the management and control of invasive exotic pest plants through support of research and monitoring; 3) to serve as an educational, advisory and technical support resource on exotics in Kentucky; 4) to initiate actions to protect Kentucky from the introduction, establishment and spread of invasive exotics; and 5) to provide a forum for all interested parties to participate in meetings, workshops, and on a rotational basis with other chapters, host a symposium for the SE EPPC to share the benefits from the information provided by SE EPPC and other recognized experts.

The KY EPPC board membership includes land managers from several state agencies and private organizations as well as representatives from the Kentucky Department of Transportation and the state Division of Pests and Weeds. Rounding out the

False Skullcap (*Mosla diantha*) as it appears in H. A. Gleason's *New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*, 1952.

Pest Plants in Kentucky (Cont.) . . . . . .

board are representatives from the US Forest Service, the Kentucky Native Plant Society, a professor from Northern Kentucky University and a native plant nursery owner.

The KY EPPC's first objective has been met. The group has developed a list of the invasive exotic plants most threatening to Kentucky's natural areas. The list was a compilation of species deemed problematic by several botanists and land managers which was then reviewed and ranked by Kentucky's leading botanists and weed experts. The list is divided into three levels of threat based on invasiveness or potential for invasiveness. The top list includes a number of species that are considered serious pests throughout the southeastern US. This list will be used as the basis for nominating more species to Kentucky's noxious weed list.

Future plans include developing educational materials for the general public, developing a list of native alternatives for gardeners and nurseries, and a review of all state statutes concerning weeds and state agency policies concerning the use and control of invasive exotics. The KNPS will be working with the KY EPPC to achieve some of these goals.

The board of the Kentucky Exotic Pest Plant Council is actively seeking to increase membership. If you would like to help combat the invasive exotics threatening Kentucky's biodiversity, please contact Joyce Bender at

(502) 573-2886 or
Joyce.Bender@mail.state.ky.us

THIS PRELIMINARY LIST of exotic plants with invasive characteristics includes species which are or could become widespread in Kentucky, spreading easily into native plant communities and displacing native vegetation:

Ailanthus altissima — tree-of-heaven
Alliaria petiolata — garlic mustard
Carduus nutans — musk thistle, nodding thistle
Celastrus orbiculatus — oriental bittersweet
Conium maculatum — poison hemlock
Coronilla varia — crown vetch
Dioscorea batatas — cinnamon-vine, Chinese yam
Elaeagnus umbellata — autumn olive, silverthorn
Euonymus alatus — winged euonymus, burning bush
Euonymus fortunei — wintercreeper
Lespedeza cuneata — Chinese bush clover
Ligustrum sinense, L. vulgare — privet
Lonicera japonica — Japanese honeysuckle
Lonicera maackii, L. morrowi, L. tatarica — Amur/bush honeysuckle, Morrow's honeysuckle, tatarian honeysuckle
Lythrum salicaria — purple loosestrife
Microstegium vimineum — eulalia, stiltgrass, Nepalese brown-top
Miscanthus sinensis — miscanthus
Phragmites australis — common reed
Polygonum cuspidatum — Japanese bamboo, Japanese knotweed
Pueraria lobata — kudzu
Rosa multiflora — multiflora rose
Sorghum halapense — Johnsongrass

False Skullcap: A New Weed Threat in Kentucky?

by David Taylor

FALSE SKULLCAP (*Mosla dianthera*) is an annual mint closely related to beefsteak plant (genus *Perilla)*, and considered by some not worthy of separate generic status. It is native to Asia, but is established in parts of the eastern United States. The plant is 3–36 inches tall depending on available moisture. It superficially resembles a skullcap (genus *Scutellaria*), hence its common name. The leaves are lanceolate to narrowly obovate with a fine-toothed margin. The petioles are distinct and up to one third the length of the leaf. Veins in the leaves are often reddish to maroon. Leaves reduce in size from the bottom to the top of the plant. False skullcap flowers are small, only a few millimeters long, and pinkish. They are borne in pairs in the axils of branches. Close inspection will reveal its flowers and leaves are very close to those of beefsteak plant. The flowers of both genera have a pubescent, lopsided (bilateral) calyx which is slightly bulbous at the base. The flowers are bilateral as well. The inflorescence of both is a loose set of paired flowers along the tips of terminal and axillary stems. The leaves of false skullcap are narrower and smaller than those of beefsteak plant, but otherwise similar. The odor while not as pleasant as that of beefsteak plant, is similar, but distinctive, allowing positive identification of the plant throughout the year. Even the skeletons of *Mosla* retain the odor through winter.

We know something of the history of the plant in the United States. It is not known when it was introduced, but record of the plant can be traced to 1939. Hollins Rogers, a graduate student at the University of Kentucky began work on his thesis that year, a flora of McCreary County, Kentucky. He found an odd mint in McCreary County, was unable to key the mint to anything in the available manuals and began to suspect it was a species new to science. He finished his thesis (Rogers, 1941) without a firm identification on his mystery mint. In his thesis he states "...Dr. Carl Epling of California is working on an unidentified mint which may be named as a new genus and species." (p.95).

A year later, an identity for the plant was published (Fosberg, 1942). The plant, *Mosla dianthera*, one of about 35 species in the genus, was reported as new to North America. The article did not state how the species may have come to be in McCreary Country, Kentucky, but there was no doubt that it was there. Rogers published two notes (1942, 1942a) in which he offered no explanations for the plant being in Kentucky. He did state that it was

(Continued on page 8)

AN OVERVIEW OF INVASIVE

False Skullcap: A New Weed Threat? (Cont.)

"well established along [Big] South Fork River below the point where the Kentucky and Tennessee Railroad reaches this stream" (1942a). This railroad is no longer in existence, and the bridge over the stream was removed a few years ago. I have not seen anything which might explain how the seeds arrived in this country, but as this area is coal country and supported numerous mines, it might be speculated that the seed came somehow with the mining operations. It might be interesting to research McCreary County families and business to see if anyone was importing goods from east Asia or had traveled there, although Rogers (1942a) also states that no one he asked had any idea of how the plant may have come to be there.

Interest in the plant faded and reference to it did not show up again until Gleason (1952) published his corrected and updated Britton and Brown Flora. The false skullcap entry included treatment in the key, a drawing and the note "established in moist soil in w. Ky." (Vol. 3, p. 190). The 8th edition of Gray's Manual of Botany (Fernald, 1970, p. 1251) also includes the species with the note "Moist slopes and floodplains, McCreary Co., Ky.; also N.C. (Natzd. from Asia)."

In 1987, a cooperative inventory for rare species was begun on the Somerset Ranger District of the Daniel Boone National Forest. The report of findings for the project listed false skullcap on the district which is in McCreary and Pulaski Counties, Kentucky (Palmer-Ball et al., 1988). In 1989, a similar cooperative project was begun on the Stearns Ranger District. Julian Campbell, several others and I found patches of false skullcap scattered all over McCreary Co. Several other people found it that summer in adjacent counties. By 1994, it had been documented from McCreary, Pulaski, Wayne, Whitley, Rockcastle, Laurel, Estill (Guettig, 1993), Edmonson (Medley, 1993), and Wolfe (Medley, 1993) Counties, Kentucky.

McCreary, Wayne and Whitley Counties share their southern borders with Tennessee. It was natural to assume that false skullcap was in that state as well. Chester et al. (1997) reported false skullcap from Pickett, Scott, Morgan, DeKalb, VanBuren, Coffee, Grundy, Marion, and Polk Counties, Tennessee. In 1998, I found the plant in Rowan County, Kentucky, the furthest north location of which I am aware. There is little doubt the plant is scattered in all of the Cumberland Plateau counties of Kentucky and Tennessee, and maybe in the mountains as well. Since Polk County, Tennessee borders Georgia and North Carolina, and Marion County, Tennessee borders Georgia and Alabama, *Mosla* could be expected in those states as well. Radford et al. (1968, p. 925) state "*Mosla dianthera* (Hamilton) Maxim. has been attributed to N.C., but no specimens have been seen."

False skullcap appears to be on the move. It has tiny seeds which are easily transported in soil and mud affixed to tires, boots, paws, and hooves. Indeed, it is most common along roads and trails. Medley (1993) provides a habitat description for Edmonson County which I have found appropriate for most places in which I have seen the plant. He writes "Common at least locally, in moist, sandy, open areas, along dirt roads, and in other disturbed areas on sandstone ridge tops and in stream valleys..." (p. 1262). I have also seen large patches of it in power line rights-of-way in what would be considered a good native species grassland. I suspect that the occasional disturbance of maintenance vehicles is enough to bring seed in and provide spots of open ground in which the seeds can germinate. It is also encountered with more frequency in open streamhead wetlands, an indication that the seeds may travel in flowing water as well. As forest lands are increasingly used for recreation, expect to see this mint spread even further than it has.

False skullcap flowers in August and September, sometimes into October. Flowering ceases with the first killing frost. *Look for this little mint next summer and fall and help track its distribution. I am interested in its spread in Kentucky and would appreciate either information about locations or actual pressed specimens. My address is listed with the KNPS board members information on page 2.*

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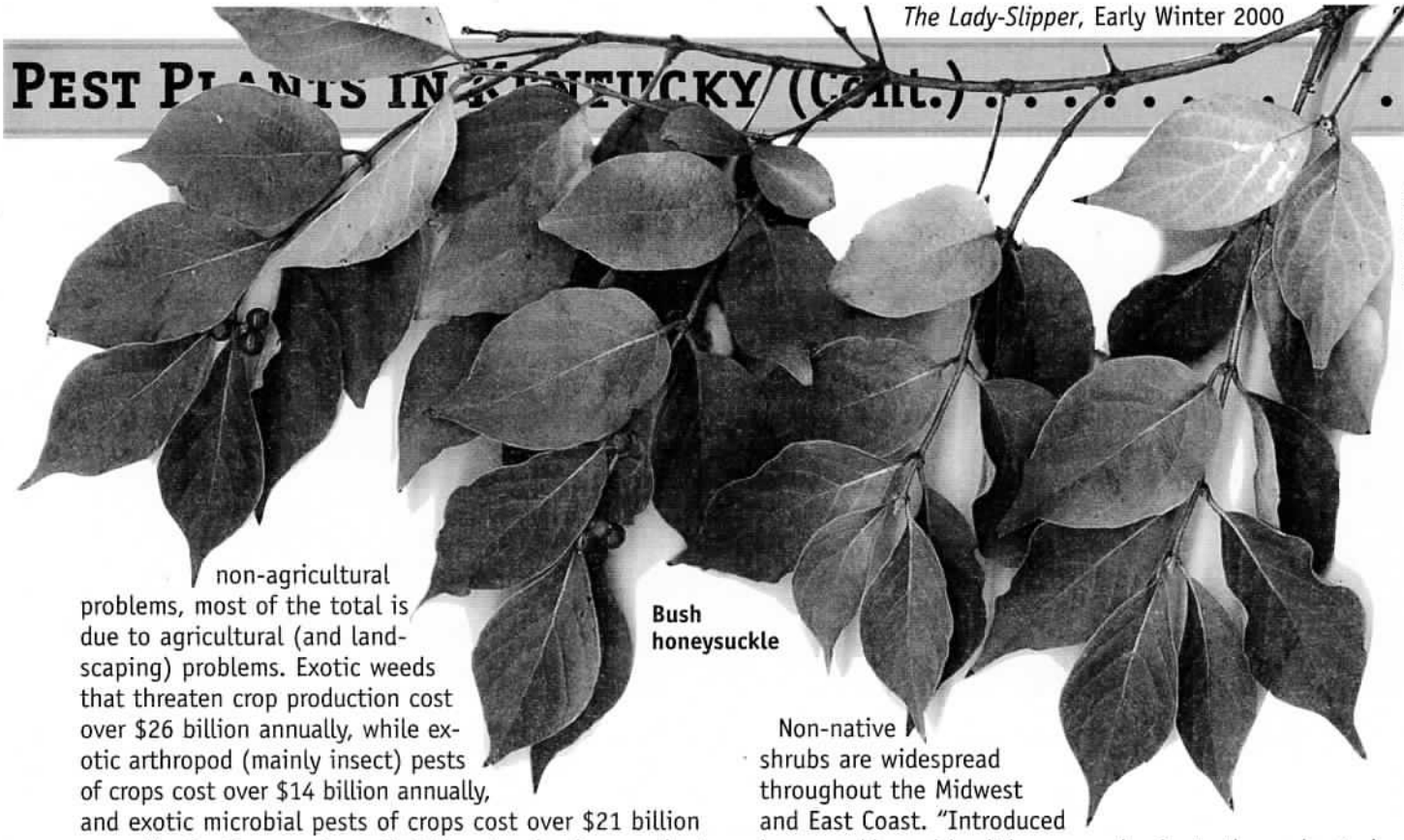
Estimated Annual Costs of Exotic Organisms in the U.S.

Professor David Pimentel and three graduate students at Cornell University recently attempted a comprehensive estimate of the economic costs associated with undesirable nonindigenous species in the U.S. There are thousands of such species—for example, possibly 5,000 introduced plants have become naturalized in the U.S., and several of them have developed into noxious weeds.

The current annual cost (losses and damage as well as control cost) associated with the undesirable exotics identified by the Cornell researchers is more than $136 billion. While a significant part of that total cost is associated with

PEST PLANTS IN KENTUCKY (Cont.)



Charles Chandler

Bush honeysuckle

non-agricultural problems, most of the total is due to agricultural (and landscaping) problems. Exotic weeds that threaten crop production cost over $26 billion annually, while exotic arthropod (mainly insect) pests of crops cost over $14 billion annually, and exotic microbial pests of crops cost over $21 billion annually. Exotic organisms that threaten landscape plants cost around $5 billion annually, and exotic pests of forests cost over $4 billion annually. A few exotic species are extraordinarily expensive: purple loosestrife (*Lythrum salicaria*) costs around $45 million annually; the fire ant (*Solenopsis invicta*) costs around $1 billion annually; the gypsy moth costs around $11 million annually; and the common pigeon costs around $1.1 billion annually. Feral cats and pet cats that go outdoors cost $17 billion (!) annually because they kill wild birds (assessed, perhaps extravagantly, at $30 each).

The point, of course, is that we currently have plenty of exotic pests in the U.S. that cost us a lot. We don't need any more! Think about that before planting potentially invasive exotics.

Reference: David Pimentel (College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14850-0901), Lori Lach, Rodolfo Zuniga, & Doug Morrison, "Environmental and Economic Costs of Nonindigenous Species in the United States," BioScience 50(1), January 2000, 53–65.

This report is reprinted with permission from the February 2000 HortIdeas *(http://www.users.mis.net/~gwill/hi-index.htm).*

Songbird Decline May be Linked to Non-native Shrubs

NEW EVIDENCE SUGGESTS that the decline of songbirds is linked to the rise of non-native plants. Birds that nest in non-native plants lose more eggs to raccoons and other predators, according to research presented in the December, 1999 issue of Conservation Biology. "Here is an ecological trap if there ever was one!" says Christopher Whelan of the Illinois Natural History Survey in Wilmington, Illinois, who co-authored the study with Kenneth Schmidt of the Department of Biology at the University of Memphis.

Non-native shrubs are widespread throughout the Midwest and East Coast. "Introduced honeysuckle and buckthorn can dominate the understories of forest preserves, particularly small, fragmented preserves surrounded by urban sprawl," says Schmidt.

Schmidt and Whelan studied nest predation of American robins and wood thrushes in a 500-acre deciduous woodland preserve near Chicago for six years. There, non-native shrubs have largely replaced the native shrubs where the songbirds once nested: honeysuckle has replaced arrowwood and buckthorn has replaced hawthorn.

The authors found that predation of both robin and thrush nests was higher in the non-native shrubs than in the native shrubs and trees. They suggest that this increase is partly due to physical differences between the native and non-native shrubs. Buckthorn lacks hawthorn's sharp thorns, which could deter mammalian predators. Honeysuckle has sturdier branches, which could both help predators climb higher and support nests closer to the ground, where they are more accessible to predators.

Wood thrushes built about half their nests in exotic shrubs. During the study period, the number of robins nesting in honeysuckle increased six-fold (from 5% to more than 30%). The researchers suggest that honeysuckle is an attractive nesting site because it sometimes leafs out before the native shrubs.

The good news is that solving the non-native shrub problem could also help solve the songbird problem. The bad news is that removing exotic shrubs and restoring natives will be a big job.

For more information, contact Kenneth Schmidt (901-678-4408, or Christopher Whelan (815-476-3134, virens@attglobal.net).

This report is passed along from an unattributed 30 November 1999 posting on the GLIN-Announce *listserve: http://www.great-lakes.net/lists/glin-announce/glin-announce.info*

. . . . . An Overview of Invasive Pest Plants

KNPS Members vs. Bush Honeysuckle at Floracliff Nature Sanctuary

Story and photos
by Carey Bateman,
Floracliff Preserve Manager

Chainsaws whining, loppers cutting feverishly, spray bottles filled with herbicide. Not exactly the first thing that comes to mind when you think of a native plant society event is it? This was the scene on October 14 at Floracliff Nature Sanctuary in Fayette County. Mary Carol Cooper gathered a group of energetic volunteers to help remove bush honeysuckle on that beautiful fall day. Marjie Becus, Joyce Bender, Robin Buckner, Emily Gallagher, Joanne Haye, Mary Nell McGreg, Dave Skinner, and Whitney Withington graciously donated their Saturday for these efforts.

Floracliff, like many natural areas, is fighting an ongoing battle with invasive exotic species. These plants threaten the native plant communities Dr. Mary Wharton, the sanctuary founder, worked so hard to preserve. We are in the process of developing an intensive management plan and mapping that will be a guide and reference for exotic control and removal.

With an estimated 4000 acres lost daily on federal lands alone, it should come as no surprise that exotic species are considered one of the leading threats to native ecosystems. What does come as a surprise is the lack of public awareness and recognition of the problem.

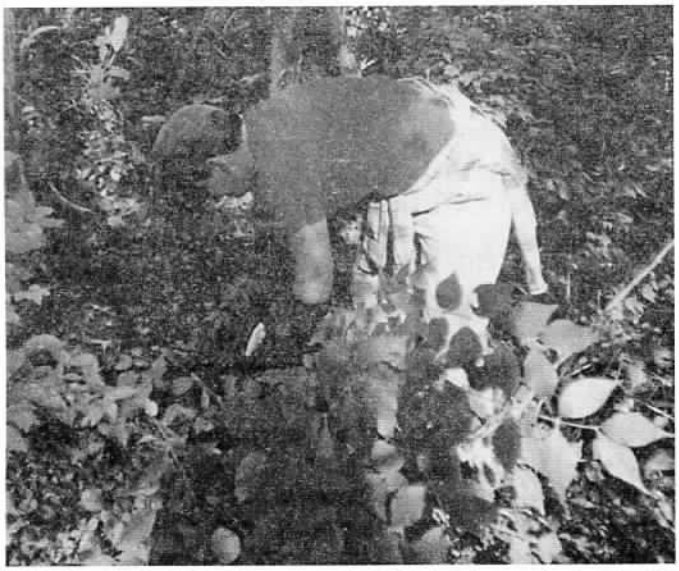
As a member of the Kentucky Native Plant Society, you have expressed interest in preserving the very thing at risk from the spread and further introduction of

At right: Dave Skinner, Joyce Bender, and Joann Haye wade into the honeysuckle bush with chainsaw, loppers, and spray bottles at the ready.

Above right: Mary Nell McGreg draws a bead on a honeysuckle stump.

Above left: The whole group enjoys a bit of rest and recreation.

IN KENTUCKY



exotic species. Please help educate friends and neighbors about responsible landscaping and consider volunteering at a weed pull. Workdays are not all hard work and sweat; conversation, beautiful scenery, and a feeling of accomplishment are what make them so enjoyable and successful. There is a wonderful sense of satisfaction after a day of cutting these unwelcome plants, a knowing that you are working to protect our precious native plants.

Kentucky Native Plant Society
MEMBERSHIP FORM

Memberships are for the calendar year (Jan.–Dec.). Our dues are modest, please keep your membership current.

Name(s) _____

Address _____

City, State, Zip _____

KY County _____

Tel.: (Home) _____ (Work) _____

Membership Category (check appropriate boxes):

Annual — ☐ $7 - Individual ☐ $10 - Family

Lifetime — ☐ $100 - Individual ☐ $140 - Family

☐ *This is a renewal.* ☐ *This is a new membership.*

Membership $_____

Gift (optional) $_____ Gifts are tax deductible. [IRC 501(c)(3)]

Total $_____ (payable to *Kentucky Native Plant Society*)

Return form & dues to:

KNPS MEMBERSHIP, P.O. Box 1943, Hyden, KY 41749

Janet Worne photographs

HIKING THE RED:
A New Kentucky Trail Guide from the Bluegrass Group Sierra Club

by Liz Kauffman

Anyone who enjoys wildflowers and natural beauty will certainly enjoy the new book: *Hiking the Red,* a complete trail guide to Kentucky's Red River Gorge, including the Natural Bridge State Park. Compiled by members of the Bluegrass Group Sierra Club, the book is a practical and portable field guide for hiking and enjoying some of the best natural areas and scenery our region has to offer. The book is light and easy to carry in a backpack, and would make a terrific stocking-stuffer for the upcoming holidays.

KNPS vice president Mary Carol Cooper contributed to several chapters on the natural history of the Red River Gorge, Clifty Wilderness, and the Daniel Boone National Forest. *Hiking the Red* includes information on low-impact camping and emphasizes the preservation and respectful enjoyment of these beautiful areas. In addition to useful seasonal information it includes a brief history of how the Gorge was preserved.

Hiking the Red is also a valuable source of contact numbers, maps, trail ratings and lengths, estimated times for hikes, Forest Service guidelines for camping, and it even includes checklists for sightings of wildflowers, warblers, and other birds. If you haven't seen a showy orchis, dutchman's breeches, red catchfly, or white-haired goldenrod this year, then you may want to get yourself a copy of *Hiking the Red* and visit the trails this coming season!

Hiking the Red can be purchased directly from the Bluegrass Group Sierra Club by calling (859) 268-2968. It is also available in Lexington area bookstores.

Salato Native Plant Program

2001 Wildflower of the Year Nomination Form

Wildflower's Common name _____

Latin name (if known) _____

Reasons for nominating _____

_____

Your name _____

Address _____

City, State, Zip _____

Tel.: (Day) _____ E-mail: _____

Date Received (for office use only) _____

See the article below for nomination details.
Nominations must be received by *January 12, 2001.*

Return form to: Salato Native Plant Program, Salato Wildlife Education Center, #1 Game Farm Rd., Frankfort, KY 40601

Nominations for the 2001 Kentucky "Wildflower of the Year" Due Soon!

by Mary Carol Cooper

Each year the Salato Native Plant Program (Ky. Dept. of Fish and Wildlife Resources) joins the Kentucky Native Plant Society in selecting a native wildflower as Kentucky's official "Wildflower of the Year." The program is designed to increase appreciation for the beauty, horticulture, wildlife, and other values of our native plants; to promote conservation of native species in the wild; and to encourage local nurseries to make these species available to Kentucky gardeners.

The Wildflower of the Year for 1997 was Butterfly Milkweed *(Asclepias tuberosa)*, in 1998, Cardinal Flower *(Lobelia cardinalis)*, in 1999, Purple Coneflower *(Echinacea purpurea)*, and this year the honor went to Wild Columbine *(Aquilegia canadensis)*. As part of this year's effort to promote the program, the Department of Fish and Wildlife Resources distributed 10,000 packets of Wild Columbine seeds to schools, garden clubs, and conservation groups across Kentucky.

Special attributes of a Wildflower of the Year should include its native origin and common distribution in Kentucky, its easy cultivability in appropriate habitats, a known value to wildlife, and ready availability of plants or seed (at least through mail order sources) for gardeners and landscapers.

If you feel your favorite wildflower qualifies, fill out the Nomination Form above and return it to the address noted. *Nominations must be received no later than January 12, 2001.*

'lewsletter return address only.
e p. 2 for contact information.)

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