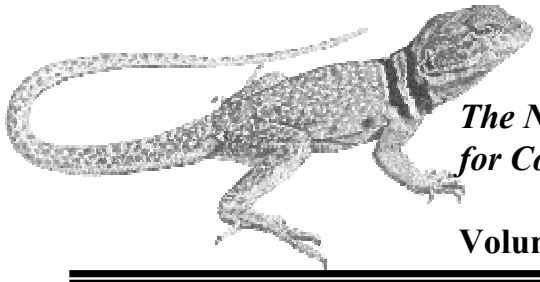

The Glade

The Newsletter of the Missouri Chapter of the Society for Conservation Biology

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The Corner

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I recently sent out an email to the MOSCB listserv in which I asked members about their thoughts on membership in environmental organizations. What follows incorporates the responses I received, as well as the views from a series of articles on the ecology-policy interface recently published in "Frontiers in Ecology and the Environment" (Feb 2003). As conservationists, we must individually decide what role advocacy plays in our professional and personal lives. Besides the ever important issue of time, our profession or employer may greatly influence this decision. For example, some argue that it is crucial for scientists to be objective so that credibility is maintained. Strict adherents to this would be unlikely to affiliate themselves with any environmental organizations, or would have very limited participation. Unfortunately, advocacy and objectivity both have their consequences. Certain environmental groups are frowned upon by some employers and membership may affect hiring, assignments, and personnel dynamics. In such cases, advocacy beyond that condoned by the employer could be jeopardizing and a decision will have to be made regarding whether to keep advocacy private. People will judge you despite your affiliations. However, it is important that we each consider our present situation and beliefs, and do some research on the objectives and activities of environmental organizations we are thinking of joining, before becoming official members. We must also remember that while environmental organization membership may stimulate and enhance advocacy, we are certainly capable of being advocates of our own volition. Many of us surely ask ourselves, "How can my work and accumulated knowledge help shape conservation initiatives and environmental policy?" One need not be an advocate to ask such an important and thoughtful question. MOSCB exists in part to facilitate communication between people of various backgrounds. I believe that one of the most effective ways to implement change is by extending our networks to a larger audience. We should take advantage of our unique human ability to think, write, and communicate by sharing our opinions, knowledge, and writing. Just as the fragmentation of native habitat into isolated islands disrupts species interactions, composition, and persistence, the compartmentalization of people into isolated entities threatens our progress and future.

The United States Military:
Defenders of Your Freedom and Natural Resources

Neil Bass, 60 10th ST Suite 211 509 CES/CEV, Whiteman Air Force Base, MO 65305;
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I am the Natural Resource Planner at Whiteman Air Force Base and my reasons for writing this are twofold. The first is to point out an area where, many may not be aware, there is potential for jobs in the biology or conservation biology field and a need for qualified biologists. Secondly, I would like to point out some of the opportunities to make a difference and affect change while working at these government facilities.

I am making the assumption that a lot of subscriber's to *The Glade* are students and may in the future be seeking employment, in which case my information may be important. A little known act, the Sykes Act, requires most Department of Defense facilities to have a natural resources person on staff. These people are charged with maintaining and improving the natural resources on their installations. With the Department of Defense owning over 25 million acres in the United States, there is a lot of opportunity for diversity of habitats and locations. Many of these positions have very diverse duties as well. My position includes doing survey work, habitat management, environmental education and outreach, and compliance tasks.

For conservation biologists, the military may be the ultimate arena in which to work. Those 25 million acres mentioned above are spread over 425 installations. These properties are inhabited by over 300 federally listed threatened or endangered species, so the need for biologists is definitely there. The Department of Defense bears a larger portion of the endangered species responsibility than any other single agency.

In addition to this responsibility or opportunity, the Department of Defense also receives 52% of the United States' budget. While only a small portion of this goes to natural resources, that small portion can still be very significant on certain projects. For example, the Navy at the Naval Amphibious Base Coronado spent $675,000 to protect snowy plovers and California least terns—that is a big budget for one project, on one island, for two bird species.

Whiteman Air Force Base, just south of Knob Noster, MO, is the home of the B-2 Stealth Bomber and is located on Highway 50, 75 miles east of Kansas City, MO. The base is about 4,000 acres and is located in the Osage Plains physiogeographic province. A large percentage of the base is on an uplifted plateau that was, until recently, dominated by prairie. During the 1990's, construction and habitat manipulation to reduce bird aircraft strikes, resulted in the elimination of most of the prairie. Small patches of floodplain pin oak and oak hickory woodlands still persist in scattered patches around the base. The majority of the base is dominated by housing, industry, and the flight line.

On a small base like Whiteman, with only one natural resources position, I am a jack-of-all-trades. Survey work here runs the spectrum including vegetation, herpetofauna (amphibian and reptile), mammal, and fish surveys. I perform habitat management by removing tree and shrub growth, treating invasive species, creating brush piles, providing structure for fish habitat, planting native vegetation, and preparing areas for prescribed burns. I assist the local high school biology teachers with field trips to a native prairie, coordinate an Earth Day event with 1,200 participants, do various programs about Missouri Wildlife in local schools, and am running a Conservation Frontiers program out of the base's Youth Center Summer and After-School Programs. Of course, there is always some additional paper-pushing for different permits and mandates.

During the first season of my survey work at Whiteman, I located two state-listed species on base, the long-tailed weasel (*Mustela frenata*) and the northern crawfish frog (*Rana areolata*). These species were ideal candidates for management at Whiteman. Their habitats could be promoted without the threat of increasing the Bird Air Strike Hazard (also known as BASH). Some limited habitat work has been done in the area where the weasel was located, but some major steps have been taken to increase northern crawfish frog habitat. First of all, a dumpsite clean-up was planned for a portion of a native prairie area. The project for this clean up was reworked to discontinue a fescue seeding. The money for the seeding was then used to construct two ephemeral pools at the prairie. No crawfish frogs have been spotted or heard calling from this area but several other frogs have been. Northern cricket frogs, western chorus frogs, southern leopard frogs, plains leopard frogs, and American toads were all heard or captured from these ephemeral pools. Native vegetation was also planted around the pools.

On the other side of base an old silted in farm pond was drained. Draining the pond killed all of the fish in the pond, thus creating a half acre fishless pond habitat. This fishless habitat will benefit several amphibian species, because fish are major predators of many larval amphibians. Hopefully two of the species to benefit will be the northern crawfish frog

and the eastern newt.

Another pond in the same general area is slated for draining and some habitat restoration work. This will provide a second large fishless breeding area for amphibians. Both ponds are also deep enough to prevent complete freeze-up thus allowing amphibian larvae to survive through even the harshest winter conditions. A sample area on the adjacent upland to the second pond was excluded from late season mowing. This excluded area quickly grew up in Indian grass and native forbs. Hopefully this area can be managed with limited mowing to provide native vegetation adjacent to the soon to be fishless pond, enhancing the area's habitat value even more.

While habitat on base is severely fragmented this is no different than many of the habitats in the surrounding counties. These projects should demonstrate ways in which good management can improve circumstances for species in decline. Even on a highly developed base like Whiteman, which has restrictions due to its flying mission, sound natural resource decisions can be made and implemented that promote species diversity and conservation, while at the same time allowing the military to perform its primary mission.

Resource Science Division – Missouri Department of Conservation

Dale D. Humburg, Division Administrator,MDC, 1110 S. College Ave., Columbia, MO 65201; email: humbud@mdc.state.mo.us.

John Hoskins, director of the Missouri Department of Conservation, announced establishment of a Resource Science Division in late summer 2002. The new division, official in January 2003, integrates the strengths of Natural History Division and the research functions previously separated in the Forest, Fisheries, and Wildlife divisions. Individually, Natural History and Research have provided excellent service to resource conservation in Missouri. In combination, the integrated suite of skills should ensure further growth in the department's science-based approach to conservation.

Several organizational changes were made last summer including the creation of the Resource Science Division. A primary objective for the agency reorganization was to establish a more efficient management structure to ensure delivery and accountability of resource management functions and agency operations. A streamlined structure included fewer regions, fewer mid-level supervisors, and fewer divisions. These changes resulted in substantial budget efficiency.

The success of Resource Science Division is predicated on greater delivery of management assistance, enhanced transfer of resource information, and integrated functions. In part, this will be accomplished by gradually positioning resource scientists in the field at regional offices or at field stations. Although a greater focus will be on field delivery, the vital core functions traditionally provided by the Resource Science Center in Columbia will be retained. The challenge to the leaders of the new division is to effectively meet the needs of Fisheries, Forestry, Wildlife, and Protection Divisions at both the statewide and regional levels. Coordination and collaboration among the Division Administrators will be essential.

Although primary strengths have been retained, the organizational structure and initial planning for the Resource Science Division are in their infancy. A basic mission is to provide the science-based information needed by the public and the agency to conserve, appreciate, and effectively manage the living resources of Missouri. The primary objective is to establish a nationally recognized science-based model for conservation by: 1) ensuring ongoing development of a comprehensive and integrated understanding of Missouri's living resources and their values to society; 2) using accumulated knowledge to inform and recommend conservation actions; 3) evaluating the biological and social impacts of conservation actions to progressively reduce the uncertainty associated with conservation decisions; and 4) reporting emerging knowledge of Missouri's living resources and the results of management evaluation in a useful and accessible manner. An integrated focus required a Resource Science Division organization centered around five systems and functions rather than traditional disciplines:

Aquatic and Wetland Systems: An integrated focus, including emphasis on aquatic and wetland species and communities of concern, will be on streams, rivers, wetlands, and floodplains and associated species. This group will coordinate statewide population management recommendations for waterfowl and collaborate with resource managers on fish population management recommendations and regional needs. Additionally, there will be a greater focus on water quantity studies including in-stream flow, stream bank stabilization, and watershed influences.

(Continued on page 5)

Long-term Monitoring Efforts for the Endangered Niangua Darter

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In many instances, species recovery efforts initially focus on monitoring to assess population viability and trends to determine the course of management action. The Niangua darter (*Etheostoma nianguae*) is a fish species of concern found only in Missouri. It has a highly localized distribution, restricted to north-flowing Ozark streams of the Osage River basin in west-central Missouri. It is a relatively large darter (approaching 11 cm in length) occupying stream reaches with clean gravel-cobble substrates and with moderate current velocities. Only eight core populations remain, primarily as a result of habitat loss due to inundation of streams by large reservoirs. Existing threats to the Niangua darter include population fragmentation, stream channel instability, increased sedimentation, barriers preventing fish movement, and nutrient inputs. The Niangua darter is listed as endangered in Missouri, and threatened under the U.S. Endangered Species Act due to their limited distribution and vulnerability of small fragmented populations. The Niangua Darter Federal Recovery Plan calls for monitoring of extant populations to assess long-term trends.

We have spent the first year of a ten-year effort establishing suitable sites to monitor remaining Niangua darter populations. Favorable locations consisted of evenly distributed stream reaches that included a high proportion of riffle and run sequences, reliable accessibility, and when possible, locations where Niangua darters had been previously observed. Visual counts were performed by two snorkelers moving upstream in a zigzag fashion. In very shallow areas, counts were conducted by slowly walking and carefully scanning the bottom. Substrate size, water depth and flow rate measurements were taken at each Niangua darter location. Additional stream characteristics such as width of the riparian corridor, stream canopy cover, length of cut bank, presence of other fish species, and occurrence of aquatic vegetation and algal mats, were also documented. Lateral secchi disk visibility, water temperature and weather conditions were determined prior to sampling each stream.

We were initially challenged in setting up our monitoring sites. We needed enough sites to effectively express long-term population trends for the remaining Niangua darter populations. Our team of four snorkelers was able to complete snorkel surveys in 75 monitoring sites for the 2002 season. Long days and many hours spent immersed in the home of the Niangua darter were required to complete all sites; this would not have been accomplished without the tireless aid of our research technicians Janice Albers and Zack Ford. Snorkel surveys were conducted late-summer through early-fall to include young-of-the-year darters. We found that Niangua darters were present in 21 of the 75 monitoring sites (28%; Fig. 1). Niangua darters were widespread in the Little Niangua River (67% of sites), Maries River (42%), and Tavern Creek (42%). Niangua darter observations were infrequent to rare in the Pomme de Terre River (22% of sites) and Bear Creek (17%). We did not observe Niangua darters in Brush Creek, Niangua River, or North Dry Sac River; however, survey work unrelated to monitoring documented Niangua darters in two locations in the Niangua River earlier in 2002.

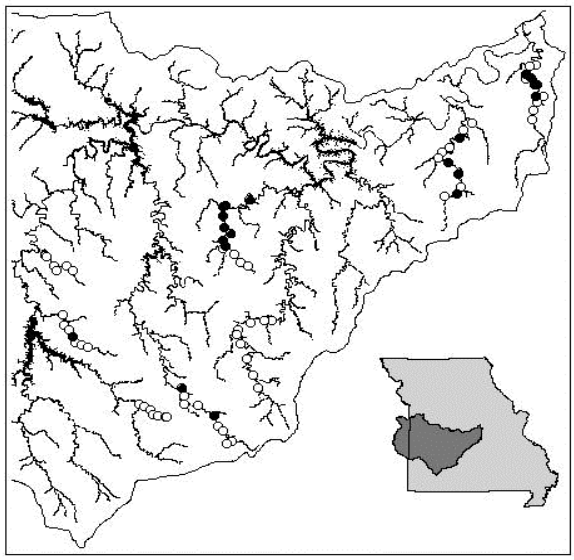

Fig. 1. Niangua darter observations in the Osage River basin, Missouri during 2002 snorkel surveys. Solid dots represent Niangua darter observations which occurred, open circles no observations.

Preliminary results suggest that darter populations have been negatively impacted by drought and habitat loss related to intermittent stream flow. Niangua darter observations tended to occur downstream from historical observations. Upstream reaches tended to be intermittent in flow, eliminating run-type habitats where Niangua darters are often found. While conducting our monitoring surveys, we counted two additional species of darter: greenside darters (*Etheostoma benniodies*) and logperch (*Percina coprodes*) to determine correlations to Niangua darters within specific habitats. The greenside darter is known to occur in similar habitats as the Niangua darter but with a much wider distribution. Researchers have speculated that the occurrence of greensides would have a positive correlation with

Long-term Monitoring Efforts for the Niangua Darter (Continued from page 4)

Niangua darter occurrence because both species seem to have similar habitat requirements and are commonly encountered at the same locations. Although we observed numerous greenside darters in stream reaches where we did not observe Niangua darters, we did, however, find greensides in almost every instance where we observed Niangua darters (Fig. 2). This may suggest an association between the two species.

Logperch showed a weak positive correlation with Niangua darters (Fig. 2), although there were instances when each species was found in the absence of the other. This is interesting because logperch have been thought to negatively impact the Niangua darter by competing for space and/or food; our data do not, however, support this hypothesis. Again it should be pointed out that this was only the first year of a ten-year study and it is too early to draw firm conclusions from these first year observations.

After completing the first year of our snorkel survey efforts, we were encouraged to document significant Niangua darter populations in three streams. However, we were concerned by the apparent absence of Niangua darters from the Sac River system (Bear Creek, Brush Creek, and North Dry Sac River). Drought conditions may be responsible, and if so, what happened to Niangua darters in the Sac River Streams and will they return? Given that drought conditions have existed in the past, a dynamic process of extirpation or out-migration and eventual recolonization from downstream refugia during wet years might be the norm in these smaller tributaries. Future research efforts include searching other streams in the Osage River basin for undiscovered populations and monitoring tributaries during the spring to determine if Niangua darters move into and out of these small streams with changes of season (spawning) and/or water levels.

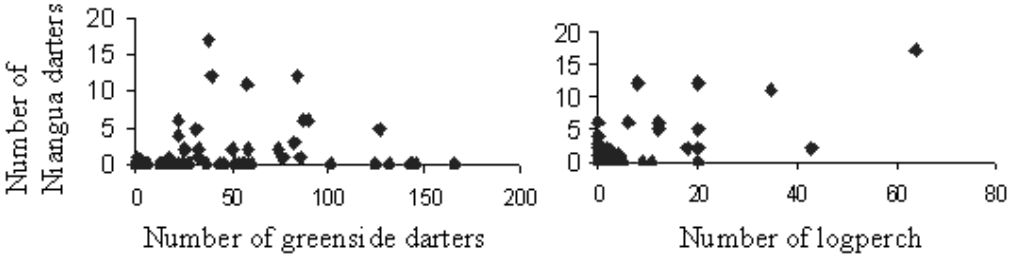

Fig. 2. Associations between Niangua darter and two other darter species during 2002 snorkel surveys in Osage River basin streams, west-central Missouri.

Resource Science Division (Continued from page 3)

Terrestrial Systems: An integrated focus, including emphasis on terrestrial species and communities of concern, will be on grasslands, agricultural systems, and forests and associated species. This group will coordinate population management recommendations for associated species. **Environmental Health:** Current monitoring and response functions will be maintained in this group which also will ensure greater focus on water quality studies, including evaluation of watershed influences. Specialized conservation services also will be ensured by maintaining emphasis on forest health and diagnostics/pathology. **Management Evaluation and Support**: Evaluating conservation efforts will be the primary focus of this group which will serve as the key liaison for management evaluation. Greater coordination of the design, conduct, and application / reporting will ensure greater utility and availability of management evaluation results. This group also will ensure integrated use of the Ecological Classification System in conservation planning and enhance information transfer. **Science and Policy Support:** This group will coordinate biometrics support for the Science Division and throughout the Department, ensure "front-loaded" consideration of project design and database standards, and maintain harvest survey functions and advance human dimensions and economics surveys. Web-based information transfer will be emphasized.

Resource Science Division is a work in progress. We are not completely confident that our proposed organizational structure and plans for field delivery will fully accomplish Resource Science Division's mission. We will, however, ensure ongoing evaluation and amendment where necessary to provide the best near- and long-term service to the Department. Our structure and functions, current location and emphasis, and personnel focus are all in transition. Near-term emphasis is focused on completing current projects while shifting emphasis to resource issues of the future. In the near term, a focus on new information may not be of critical importance; however, without a forward-thinking approach to resource challenges, we will not be positioned for the future of conservation success.

Bringing Back *Festuca paradoxa*, a Native Cool Season Grass, to the Midwest

Nadia E. Navarrete-Tindall, 202 Natural Resources Building, University of Missouri, Columbia MO, 65211. E-mail, navarreten@missouri.edu.

Festuca paradoxa Desv. is a little known native cool season grass with distribution in 23 states (Hitchcock 1971, Yatskievych 1999). It is endangered or of special concern in Indiana, Maryland, Pennsylvania, and Tennessee (Natural Resources Conservation Service 2002, A. Heikens, personal communication 2002). It grows under full sun in prairies and under moderate shade in forest openings and prairie draws (Hitchcock 1971, Mohlenbrock and Voight 1974, Yatskievych 1999). It is found scattered in one-third of the state of Missouri; however, during a two-year search in collaboration with the Missouri Department of Conservation's "Missouri Ecotype Program" only two conservation areas were identified where this grass grows in abundance.

Festuca paradoxa commonly known as cluster fescue or paradox grass, lacks rhizomes, has 10 to 40 cm long leaves, up to 1.2 m long panicles that droop at maturity (Kucera 1998, Yatskievych 1999). It flowers in May during the second growing season with seed maturing in early July. Seeds persist in panicles through the fall. Paradox grass reproduces readily from seeds and tillers. Seed germination varied from 55-70% for seed collected for three consecutive years from Tucker Prairie. Seeds were maintained at 60-68^{o}F and grown in a soil medium in the greenhouse or on germination paper in growth chambers for up to 45 days. Seeds start germinating as early as 15 days after planting under 50^{o}F and at day 21 under 60^{o}F. Paradox grass can be confused with the common *Festuca subverticillata* Pers. (nodding grass). Common grass is mainly found in heavy shade in wooded stands. In addition, these two grasses differ in the shape of mature inflorescences and other external characteristics (Aiken and Lefkovitch 1993).

Unlike the non-native *F. arundinacea* Schreb. (tall fescue) that invades native herbaceous communities (Randall and Marinelli 1996), native fescues are not invasive. The replacement of native cool season grass in pastures or public areas where tall fescue is found has the potential to increase plant diversity and improve wildlife habitat. Studies are being done to determine if paradox grass can compete in the presence of a seed bank of tall fescue when planted in pastures. Rabinowitz et al. (1989) showed that paradox grass persisted for more than eight years when in competition with more common warm season grasses at Tucker Prairie. More recent studies suggest that paradox grass responds vigorously following summer burns with abundant seed production the following year (Mechlin 1999). In contrast, warm season grasses and other vegetation that grows in association with them favors spring burns. Other vegetation that grows in association with paradox grass include prairie junegrass (*Koeleria macrantha*), sweet coneflower (*Rudbeckia subtomentosa*), culvert's root (*Veronicastrum virginicum*), white wild indigo (*Baptisia alba*), rattlesnake master (*Eryngium yuccifolium*), knotroot foxtail (*Setaria parviflora*), downy gentian (*Gentiana puberulenta*), dropseed (*Sporobolus heterolepsis*), manna grass (*Glyceria striata*), and several sedges (*Carex* spp.).

Most of the grasses recommended for planting on public right-of-ways or on private lands for soil conservation or wildlife habitat are warm-season grasses or non- native cool season grasses (Missouri Department of Conservation 2001). The Missouri Deparment of Conservation's "Grow Native!" Program and the Missouri Department of Transportation would recommend paradox grass for roadside sites and for native plantings when seed becomes available commercially (J. Allmon, personal communication, Grow Native 2003). The addition of paradox grass and other native cool season grasses like river oats (*Chasmantium latifolium*), wildryes (*Elymus canadensis* and *E. virginica*), and prairie junegrass to seed mixes will introduce the native cool season grass component (L. Mechlin, personal communication) to provide additional cover and forage for wildlife in early spring and late fall.

Because paradox grass grows naturally under different shade levels, a two-year potted shade tolerance study was conducted at the University of Missouri. Paradox grass grew well and produced seed under moderate shade or full sunlight.

Bringing Back *Festuca paradoxa* (Continued from page 6)

Individuals and volunteer organizations familiar with this grass are helping to locate more populations in Missouri for seed collection. Seed production plots of paradox grass and other four native cool season grass are being established at the Horticulture and Agroforestry Center in New Franklin to test planting times, shade tolerance, fertilization regimes, and seeding rates on establishment, growth, persistence, and seed production. A private seed producer, using similar techniques to grow introduced fescues, will conduct an additional seed production study in Biehle, Missouri. Also, demonstration plots will be established at the University of Missouri's South Farm in Columbia to evaluate *F. paradoxa* as a turf grass. Other work includes the development of best management techniques in conservation areas and the evaluation of paradox grass as a forage species in pastures and as a companion crop in agroforestry practices. We expect that by 2004 recommendations on how to maximize seed production of this grass will be available for interested seed producers. If you want to learn more about this grass or help us finding more locations of this grass or other native cool season grasses in natural areas please send email to: navarreten@missouri.edu.

Acknowledgements—This research is supported in part by a Missouri Department of Conservation and Department of Natural Resources, MoCARG Grant with the collaboration of the USDA Forest Service North Central Experiment Station, the Horticulture and Agroforestry Research Center (HARC), the Center for Agroforestry of UMC, the MDC Missouri Ecotype and the Grow Native! Programs. Special thanks to personnel at HARC, Becky Erickson, Larry Mechlin, Jerry Van Sambeek, and Robert Pierce.

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Announcements

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If you would like to help support MOSCB's activities and publication of *The Glade*, please send your contribution to MOSCB, care of Chrissy Howell, MOSCB Treasurer, Department of Biology, 223 Research Building, 8001 Natural Bridge Road, University of Missouri-St. Louis, St. Louis, MO 63121-4499. Suggested donations are $5 for students and $15 for other members. Thank you for your support!

The Glade

attn: Michelle Boone

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When one tugs at a single thing in nature, he finds it attached to the rest of the world. --John Muir

Membership Information

The goal of MOSCB is to promote communication among conservation biologists throughout the state of Missouri. Membership in MOSCB is free. Please visit our MOSCB web page for more detailed information (http://www.snr.missouri.edu/moscb).

The Glade Vol. 6, No. 1 was edited by Michelle Boone. Special thanks to the authors in this issue for their time and thought in writing their articles. Special thanks to Missouri Botanical Garden for providing funds to support this edition of *The Glade*.