DIVERSITÉ

by Matt Bowser

I recently returned from the 2006 meeting of the Entomological Society of Canada in Montreal, Quebec, where this year's theme was diversité (diversity). Many interesting talks and posters were presented about insects and spiders of northern North America, ranging from genetics of butterflies in British Columbia to behavior of small-headed flies in Washington and biocontrol of the amber-marked leaf miners on birch trees in Alaska. The six or eight-legged subjects of these studies were often the same species we have here, reflecting the similarity between our forest and alpine tundra on the Kenai to the vast boreal forest and tundra of the rest of northern North America.

There were numerous talks related to the diversity theme, such as spider communities along the Demster Highway in the Yukon Territory, diversity of flies in wetlands of various sizes in Quebec, and studies on the ground beetle assemblages of northern prairie range lands. I traveled to the meeting to present on our efforts to inventory, model, and monitor terrestrial insects and spiders on the Kenai National Wildlife Refuge.

As with all Alaska refuges, the Kenai NWR was specifically mandated by Congress in the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), "to conserve fish and wildlife populations in their natural diversity," where fish and wildlife is defined as, "any member of the animal kingdom including without limitation any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate." We knew little, though, about the most diverse and one of the most ecologically important groups of animals on the Kenai; we did not have a good idea of what kinds of insects we had here, much less where they occurred or how abundant they were.

In order to address our conservation mandate, we designed a Long Term Ecological Monitoring Program (LTEMP) to efficiently sample many kinds of animals and plants on a grid of 300 points distributed over the entire two million acre refuge. We sampled this grid in 2004 and 2006 using fast, "swat team"-like methods to quickly inventory plants, birds, and insects at each point, usually with helicopter support.

As I attended various presentations on arthropod diversity and spoke with other researchers, it became apparent that our approach to inventorying the insect and spider fauna of the refuge is unique. Most comparable projects focus on relatively small groups of species in either a small area or a few locations. What sets our work apart from most other efforts is that we have sampled many kinds of plants and animals, and we have done so over a vast area of two million acres.

This enables us to make generalizations that apply to the entire Kenai National Wildlife Refuge. For example, we found that both the abundance of insects and the number of different kinds of insects (diversity) were highest in the lowland areas of the refuge and lowest in the mountains. We can learn about the distribution and abundance of insect species, assess the preferred habitat of each species and produce distribution maps of each species.

Since we sampled repeatedly, we can show differences between years. For example, we found that mosquitoes were not deterred by the rainy June of 2006 (an average 19 mosquitoes per sample) compared to the dry June of 2004 (12 per sample). Bumblebees, which use the sun to navigate, were infrequent in our 2004 samples, but were not collected at all in 2006. If these kinds of surveys are repeated over the long term, we should be able to monitor insect populations and distributions in response to potential changes due to fire, climate, development, or unforeseen factors. We would also hope to detect the arrival of exotic insects, possibly in time for defensive measures.

Sorting, identifying, and understanding the arthropod fauna of the Kenai National Wildlife Refuge using the LTEMP samples has been part of my work for an M.S. in biology at the University of Alaska Fairbanks under Dr. Patricia Doak. The U.S. Fish and Wildlife Service, the University of Alaska Fairbanks, and Marathon Oil have graciously funded my work. I owe special thanks to Dominique Collet, who has shared his entomological resources and helped with identifications, and to Charlotte Hockin, who sorted over half of the specimens. Several others have helped with identifications.

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Wildlife Refuge for three years as a biological technician and STEP graduate student. He is currently pursuing an M.S. in biology through the University of Alaska Fairbanks. Previous Refuge Notebook columns can be viewed on the Web at http://www.fws.gov/refuge/kenai/.