

Shared Beringian Heritage Program Underway

By Dale Taylor

Editor's Note: This is the first of several articles planned to cover results stemming from the Shared Beringian Heritage Research Program.

Mysticism surrounds the narrow strait separating the continents of Asia and North America. This region, which today is ice covered much of the year giving rise to extremely cold water during the short summer, is near the heart of "Beringia." Beringia, the name used by botanist Hulten as early as 1937 (Matthews 1982), describes an area of Alaska and Siberia that was, in part, intermittently covered by seas (Fig. 1). Evidence points to the Bering Land Bridge between North America and Asia at numerous times beginning in the early Tertiary and as recently as 13,000 and possibly 11,000 years ago (Hopkins 1967). This alternate formation and later covering of the land bridge by water as the continental ice sheets waxed and waned, provided opportunities for genetic and cultural exchanges and isolation.

The cultural and biological heritage of Beringia has been recognized for many years (Hopkins, et al, 1982 and Hopkins 1967). Prevailing political climate prevented proposals by Roberts (1981, 1984, and 1985) for an international research park in Beringia

from reaching fruition. However, in 1986 the Beringian Heritage International Park project was established under the authority of the 1972 US-USSR Agreement on Cooperation in the Field of Environmental Protection, working group 02.04.20. Specific activities were developed by the working group in protocols of June and October 1987. The Agreement was reauthorized in May 1992 and included working group 02.04.40-44 dealing with establishment, management, policy, and research in the Beringian Heritage International Park.

In September 1989, American and Soviet planning teams recommended an international park in a report entitled the *Beringian Heritage Reconnaissance Study* (1989). Presidents Bush and Gorbachev issued a summit agreement in June 1990 calling for cooperation in studying ecology, archaeology, and cultural heritage in the Bering Strait. Though President Gorbachev stepped down from power following the September 1991 coup in the USSR, the process for establishing the park continued. Presidents Bush and Yeltsin issued a joint statement in June 1992 to reaffirm their vision of the Beringia International Park as formal recognition of the shared natural and cultural heritage of the

Bering region. Legislation to establish the park is in various stages in both countries.

In response to these agreements, yet ever mindful of the political arena, where changes could influence final establishment of the park, the NPS embarked on a Shared Beringian Heritage research program. The international, multidisciplinary research program brings Russian and American scientists, resource managers, and Native people together in a long-term, integrated study of traditional lifeways, biogeography, and landscape history on the Seward and Chukotka Peninsulas (Schaaf 1992). Papers describing the research will be presented in future issues of *Park Science*. The purpose of this paper is to present preliminary results from botanical studies being conducted in Alaska and Chukotka as part of the Shared Beringian Heritage Program.

THE FLORA PROJECT The Need

The intermittent emergence of the Bering Land Bridge favored an exchange between the two continents, predominantly the dispersal of plants from Asia to America. Knowledge of the flora, which will lead to understanding interchanges between two continents, although greater in Chukotka than in

Figure 1. The Russian Far East, Alaska, and portions of Canada outline the approximate area of "Beringia." Drawing by Kate Solovjova.



Alaska, is incomplete in both areas. Botanists from the Komarov Botanical Institute, St. Petersburg, Russia, have been collecting information in Chukotka for years.

On the other hand, Kelso (1993) describes the first plant collectors on the Seward Peninsula as naturalists on the early voyages of arctic exploration. They focused almost entirely on areas around the few harbors offering protection from the Bering Sea storms. Major inventories in the interior are few, but include the survey prior to establishment of the Bering Land Bridge National Preserve (Melchior) and work by Kelso (In prep.). The Bering Land Bridge National Preserve herbarium contains about 1,000 specimens and represents ongoing work. Little work had been done on non-vascular plants on the Seward Peninsula.

Project objectives are to: create databases for Bering Land Bridge National Preserve in a standard format that can be used by other parks; complete a checklist for different taxa; complete monographic descriptions of flora for comparison on a continental scale; complete geographic ranges; develop systems of biodiversity monitoring; create a standard geographical basis for the analysis of arctic biota; identify areas where intensive inventory and monitoring will be conducted on selected taxa; and develop general principles for database organization for analysis of floristic data.

Project Staff

An International Panarctic Biota Project is being organized by scientists from Russia and North America. The project is divided into categories of flora, mammals, birds, fish, invertebrates, etc. Project objectives fit with the overall objectives of the Beringian project and provide the added benefit of making the work a part of a circumpolar effort. An agreement was reached with leaders of the Panarctic Flora project in 1992 to begin in this "crossroads of the continents" with priority for work being done in Bering Land Bridge National Preserve.

Dr. Boris Yurtsev, Head, Laboratory of Vegetation of the Far North, Komarov Botanical Institute, St. Petersburg, (vascular plants), and Dr. David Murray, Curator of the Herbarium, U/AK Fairbanks (vascular plants), are leaders of the Circumpolar Flora project. Dr. Yurtsev has worked on the Chukotka Peninsula part of the Beringian International Park; Dr. Murray has worked in Alaska and headed the Herbarium for over 20 years. Co-Investigator Dr. Barbara Murray is Research Professor of Cryptogamic Botany and Honorary Curator of the Cryptogamic Collection at the U/AK Herbarium, and specializes in bryophytes and lichens. Dr. Sylvia Kelso, Colorado College (vascular plants), Dr. Mikhail Andreev (lichens), Dr. Olga

Afonina (mosses), and Dr. Alexey Potemkin (hepatics), all of the Cryptogamic Botany Lab, St. Petersburg, and I completed the field crew. Dr. Alan Batten (database manager) and Carolyn Parker (herbarium assistant), Rich Harris, Anne Coupland, and Tauny Rogers (Bering Land Bridge National Preserve Resources Management staff) completed the working crews over the 2-year period.

After a 2-month field and laboratory season in 1992, the following preliminary results have been provided by specialists:

Vascular Plants (David Murray)

Collected were 669 plants, which translated into 2 or 3 times as many sheets of specimens. These were re-examined in the lab and now await data entry and labels, which the computer will print automatically, before breaking them into sets for distribution to Bering Land Bridge Preserve, Komarov Institute, and the Herbarium in Fairbanks.

Among the 480 taxa noted, one appears to be a new species and several are new to science at infraspecific ranks (subspecies or variety); 25 Asian taxa have been reported for the first time from North America; 30 taxa are new records for the Seward Peninsula as per the checklist of Kelso (manuscript), and more than 100 extensions of range on the Seward Peninsula are recorded. The final precise tally awaits further work and, most of all, a resolution of differing traditions in taxonomy and species concept manifest in the view of the Russians of the Komarovian school vs. the Americans.

Russian scientists Dr. Olga Afonina, Dr. Alexey Potemkin, Dr. Mikhail Andreev, and Dr. Boris Yurtsev in Bering Land Bridge National Preserve. *Photo by David Murray.*



Hepatics (A. D. Potemkin)

Generally it is true that the liverwort flora of arctic Alaska is poorly known, and prior to this study only about 20 species had been reported from the Seward Peninsula. Almost all the taxa collected represent additions to the flora of the Seward Peninsula. We found taxa new to arctic Alaska, new to Alaska, new to North America, and one taxon new to science.

During the expedition about 400 specimens were collected. These included about 150 taxa (126 species, 4 subspecies, 13 varieties, and 4 forms). Approximately 1/3 of all taxa (35 species, 2 subspecies, 8 varieties, and 3 forms) are new for arctic Alaska.

Some discoveries represent considerable range extensions. Three species were found in the Arctic, in the strict sense, for the first time; two species were known previously in North America only in the Northwest Territories, and one species only in Washington and British Columbia. Several taxa are new to North America. Before confirming the identification for some taxa among those apparently new to North America, it will be necessary to examine material at other herbaria.

A taxonomic description is being prepared for *Gymnocolea fasciniifera*, a species new to science.

Mosses (O. M. Afonina)

Little has been recorded about the Seward Peninsula mosses, so many of the species found in 1992 represent new records for the

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Peninsula. Approximately 1,000 collections were made. To date, about 70 percent have been identified. The preliminary checklist includes about 230 species; three are new for North America and five are new for Alaska. Several rare and otherwise interesting species for the Seward Peninsula were found and new data on their distribution and ecology were obtained.

Lichens (M.P. Andreev)

Time constraints have prevented identification of approximately 1/2 the collection made during 1992. Those identified include the most common species, mostly macrolichens (fruticose and foliose forms). Much of the unidentified material is of difficult crustose lichens.

At this time the species list totals 218, most of which have been reported previously from Alaska. Because the Seward Peninsula is poorly known lichenologically, 30 species otherwise common in Alaska are reported here as new to the Seward Peninsula. Identified material includes two species new to North America, one species new to Alaska, and nine rare Beringian species.

Comparison of Alaskan And Chukotka Vascular Flora (B.A. Yurtsev)

The vascular plant floras of Chukotka and western Alaska are very similar. Of the 480 taxa at the rank of species and subspecies in our preliminary list, fewer than 40 are not found in Chukotka as well. The similarity is especially strong on calcareous habitats such as the Eldorado Creek uplands. The Asiatic component of the Alaskan flora was better defined by 1992 field work that has added about 25 Asiatic taxa to the flora of Alaska.

Research has focused on hypoarctic and arctic-boreal complexes of continental, not oceanic, affinities. A notable exception is the occurrence of halophytic species like *Chenopodium glaucum* (var. *salinum*) and *Puccinellia hauptiana* at Serpentine Hot Spring, but these were confined to the immediate vicinity of the hot spring where various salts had precipitated on the surface of the otherwise bare soil. This pattern is repeated at hot springs on Chukotka. The importance of the continental species decreased with elevation, which was evident in the distribution and local importance of *Rhododendron camtschaticum* subsp. *glandulosum*, *Saxifrage nudicaulis*, and *Luzula beringensis* on the slopes of Mt. Boyan at Kuzitrin Lake.

There is a larger boreal element (*Populus balsamifera*, *P. tremuloides*, *Betula cf. kенаика*, *Picea glauca*) on the Seward Peninsula than on Chukotka, which is a reflection of the major zonation represented at each locality. The Seward Peninsula is mainly in the southern hypoarctic subzone, whereas

Chukotka is primarily in the middle hypoarctic subzone of the tundra. There also was an underrepresentation of arctic and arctic-alpine species (e.g. of the genus *Draba*) even on calcareous substrates.

Traveling by air from south to north on the Peninsula revealed a shift from shrublands and thickets in the south to rolling hills and high terraces covered, for the most part, by tussock tundra, *Eriophorum vaginatum*. In the shrub zones the willow thickets on carbonate landscapes have a parallel in the Chegitun River drainage on the Chukotka Peninsula, and the mixed thickets of willow, shrub birch, and alder on non calcareous areas are similar to those on the coast of the Anadyr estuary and in the Amguema intermontaine depression.

Generally, the shrub birch thickets, which are so prominent in Alaska, play insignificant roles in adjacent, easternmost Chukotka. The tussock tundra associations have a less diverse herbaceous element in Alaska than in Chukotka; that is, the vascular plant species richness is higher in Chukotka. Extensive surveys near the village of Yanrakynnot have yielded 450 taxa. While the very short surveys in Alaska are not strictly comparable to Yanrakynnot results, nevertheless it is instructive to note the following tallies: Eldorado Uplands (1 day) 140 taxa, Trail Creek (1 day) 170 taxa, Lost Jim Lava Flow (2,000 years old) (1/2 day) 50 taxa, Quartz Creek (3 days) 220 taxa, Serpentine Hot Spring (4 days) 200 taxa.

1993 Fieldwork has just concluded with results similar to 1992, but with fewer "new" findings. One species thought to be rare was found more commonly than expected. Additional material was collected for describing new species. Within a few months, the herbarium at Bering Land Bridge Preserve will be expanded several fold. Lists of species collected by site, and for the park as a whole, will be available. These lists will become part of a larger circumpolar project and will be incorporated into an international database (Allen 1993). New keys are needed immediately to replace the one rendered obsolete with the new data.

There are still areas needing botanical work within Bering Land Bridge National Preserve, and as this work occurs, more species will be found and more range extensions will be noted. For now, we have "finished" a plant inventory in one park unit in Alaska, leaving only 53 million acres more to contemplate!

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