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Agricultural Research Service, NAA
Plant Genetic Resources Unit
Geneva, New York

Foreign Travel Report

Plant Collection Expedition to Kazakhstan and Kyrgyzstan

September 6 - September 28, 1993

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TEAM MEMBERS:

P. L. Forsline - USDA/ARS, Plant Genetic Resources, Geneva, NY
G. I. Mink - Washington State University, Prosser, WA
E. E. Dickson - Cornell University, Ithaca, NY
D. Noiton - Hort. Res. Inst., Havelock North, New Zealand

COUNTRIES VISITED AND PERIOD OF TRAVEL:

Kazakhstan & Kyrgyzstan September 6 - September 28, 1993

Travel to Moscow, Russia ... Sep 6-7
Moscow ... Sep 7-9
Travel Moscow to Alma-Ata, Kazakhstan ... Sep 9
Travel Alma-Ata to forestry camp near Topolevka, Kaz...Sep 10
Expedition in Topolevka area ... Sep 10-13
Travel Topolevka to Lepsinsk, Kaz... Sep 13
Expedition in Lepsinsk area ... Sep 13-15
Travel Lepsinsk to Alma-Ata ... Sep 15
Expeditions in Alma-Ata area ... Sep 16-19
Travel Alma-Ata to Chimkent, Kazakhstan ... Sep 19-20
Travel Chimkent to Boraldy, Kaz ... Sep 20
Expedition in Boraldy area ... Sep 20-22
Travel Boraldy to Koumhama, Kyrgyzstan ... Sep 22
Expeditions in Koumhama area ... Sep 22-23
Travel Koumhama to Alma-Ata ... Sep 23
Expeditions, consultations and specimen preparations in Alma-Ata area ... Sep 24-26
Travel Alma-Ata to Moscow ... Sep 27
Travel Moscow to USA ... Sep 28

HOSTS AND INSTITUTIONS VISITED:

Prof. A. Djangaliev and A. Amanbayev, Committee of Forestry, Alma-Ata, Kazakhstan

Dr. A. Smuryghin, Kazakh Research Institute of Fruit Growing and Viticulture, Alma-Ata, Kazakhstan

Prof. I. Rachimbaev, Main Botanical Garden, Academy of Sciences Republic of Kazakhstan, Alma-Ata, Kazakhstan

Prof. B. Venglovsky, Institute of Forestry and Walnut Breeding, Bishkek, Kyrgyzstan.

PURPOSE OF TRIP:

The objectives of the trip were to: 1) collect germplasm of *Malus* (apple) in its center of origin; 2) collect germplasm of other important crops, particularly fruit crops; 3) make professional contacts with scientists and administrators associated with regional institutes to facilitate germplasm and technology exchange.

EXECUTIVE SUMMARY:

The expedition was very successful. We collected 129 accessions representing 16 genera (24 species) with 33,000 seed collected. *Malus* collections included 65 accessions (18,000 seeds) representing 3 species endemic to that area. Collection of cuttings of elite materials was kept to a minimum (5 apple, 10 grape and 1 pear) as U.S.A. quarantine facilities are already taxed. The other major collection of *Vitis vinifera* (21 accessions (8700 seeds) from along a spring-fed stream in a very xerophytic site. We were able to access some very remote sites with transportation by helicopter. We are confident that we obtained some very unique germplasm from areas that have never been explored by Western scientists. Our headquarters in Alma-Ata were at 43°,12'N; 76°,59'E. We travelled northeast to 45°,32'N; 80°,44'E and southwest to 42°,53'N; 69°,52'E within Kazakhstan. We also travelled to 41°,16'N; 72°,57'E within Kyrgyzstan. Seven unique ecosystems were explored in 12 expeditions. Our only regret is that the wild apple crop was sparse due to a severe spring frost. However, we probably made selection for frost tolerance. Our host is willing to sponsor a follow-up trip in 1995/96 to acquire broader diversity in *Malus* and expand collection in other important crops.

TRIP PREPARATION:

Appendix 1 is the proposal that was submitted to Dr. Calvin Sperling, Plant Exploration Officer of the USDA/ARS, National Germplasm Resources Laboratory, Beltsville, MD. The Apple CAC had given its prior concurrence. The proposal was reviewed by a peer panel and funded. The host, Professor Djangaliev was consulted numerous times between March 1993 and departure time via his personal FAX machine and telephone calls with his interpreter, Saule Dusembina. Specific details of the trip were arranged during this period of time, including arranging his reciprocal visit to the Western United States which followed in October 1993. Kazakh participants and itinerary for sites in Washington, Oregon, and California are included in Appendix 2.

To assist others in planning plant explorations, the list of important supplies to carry follows. Many of these supplies served the entire expedition team which required preplanning:

1) Important papers: documents and agreements of expedition, slides of program for seminars, passport and visas, airline tickets, copies of documents (i.e., passport, airline tickets, travelling papers, itinerary, critical phone and FAX numbers such as Embassies), extra passport photos, permits for carrying germplasm back to USA, business cards and card registering participants with an emergency evacuation service (International SOS Assistance, 800/523-6586).

2) Medical consultation: check with travel consultants associated with your university or USDA personnel office regarding immunizations required for the region travelled. Do not accept the answer of the first person you call. Many universities provide excellent services through their Health Centers.

Medical supplies: insect repellent with DEET, powdered electrolyte solution for severe dehydration, water filter, iodine tablets, hypodermic needles (3 sizes with M.D. authorization letter), prescription medication (Erythromycin for respiratory or wound infections, Ciprofloxacin for intestinal infections, ciloxan topical drops or ointment for eye infections and Tylenol with codeine), Immodium, dramamine, decongestant, skin care products (Betadine, Desitin, Benadryl cream, Neosporin ointment, hydrocortisone cream, sunscreen, chapstick, antifungal foot powder), eye moisturizer, aspirin, first aid kit (3 sizes of bandaids, butterfly closures, 2 sizes sterile pads, roll of gauze, ace bandage, oral thermometer, instant cold pack, tweezers, scissors, needles, thread and moleskin), moist antibacterial tissues and regular tissues (12 - 20 packs of each).

3) Expedition supplies: Global Positioning System (GPS

that is programmed prior to departure), altimeter, microcassette recorder (MCR), with extra cassettes, batteries for GPS and MCR (lots), camera (12 rolls of film), clipboard, data collection forms and notebooks, topographic maps (detailed), transparent metric ruler, nylon rope, safety pins, rubber bands, scion labels, paper/string labels, seed envelopes, markers and highlighters (5 colors), extra pens and pencils, tape (masking, packaging and duct), paper clips, 2 flashlights, small pruning shears with belt sheath, small binoculars, compass (clips to shirt), hand lens, plastic bags (2 sizes) and twist ties, zip-loc bags, 2 large cloth bags, pocket knives (2 sizes), supplies for herbarium unless arranged with host.

4) Personal items: backpack with 4 compartments, fishing vest with many pockets, flask (1 liter), small box paper cups, durable hiking boots, light rubber overboots, light raincoat, heavy winter coat (old one that you may leave with host; needed for high altitudes and chilly evenings), extra eyeglasses, sunglasses, toiletries, old towels and wash cloths, finger nail clippers, small mirror, liquid laundry detergent, proper clothing, head gear, granola bars and tea bags.

5) Supplies for host: plant germplasm for exchange (scions or seeds), books and literature, token gifts including those for children.

DETAILS OF EXPEDITION:

Sep. 5 - G. Mink and E. Dickson departed Prosser, Washington and Calgary, Alberta, Canada for New York City. They stayed overnight to make sure of connections for Moscow.

Sep. 6 - P. Forsline met G. Mink and E. Dickson at JFK airport for departure to Moscow.

Sep. 7 - We arrived in Moscow at Sheremetyovo airport at 11:30 a.m. We were met by our host, Mr. Sergi Elizarov, Deputy Chairman, Board of Directors, Joint-Stock Company (Slaviane), 22/15 Malaya Bronnaya, 103102 Moscow, Russia, tel. 095-291-61-81, FAX 095-292-65-11. His company is a distribution company for many Western products. He and his driver drove us to our hotel 20km north of Moscow center (Hotel for Hunters and Fishermen). It was a modest facility in the heart of a residential area. There we met our New Zealand adjunct expedition member, Dr. D. Noiton who joined us for the remainder of our travels. We spent the afternoon touring Moscow with a colleague of E. Dickson's who hosted the USSR expedition in 1989, Dr. Igor A. Smirnov, Main Botanic Garden, Botanicheskaya ul 4, 127276 Moscow, Russia, tel. 095-482-1108. We had lunch at the McDonald's near Red Square. It was a peaceful time at Red Square just 2 weeks before the political uprising.

Sep. 8 - We had plans to visit the Institute of Horticulture in Biruliovo, but found out that our interpreter for the day was unavailable. Our contact there was Dr. Kashin Vladimir Ivanovich, Institute of Horticulture, Biruliovo, Russia, tel. 095-329-51-66, FAX 095-329-31-66. E. Dickson was able to visit this institute on Sep. 30 after extending her stay in Moscow. She was able to speak with fruit tree virologist, Prof. Kuchina who spoke English and told her about the institute. There are 150 PhDs who work in 10 departments including: Plant Breeding, Agrochemistry, Physiology, Mechanical Harvesting, Agrotechniques, Propagation, Food Preservation, Tissue Culture, Biotechnology and Plant Pathology. They have a collection of old apple varieties that came from small communities near Moscow. He believes there is no reason to collect wild apple germplasm as the domestic apple has enough diversity (an ironic contrast to the objectives of this expedition).

Without our interpreter, Mr. Elizarov's driver, Yurri, took us to a museum, Kuskovo (czarist mansion on the outskirts of Moscow), a Russian Orthodox Cathedral with a Mass in session and to the office of Mr. Elizarov. His office was quite impressive with a modern capitalistic flavor and a well-dressed efficient staff. His business depicted a side of Moscow that we became aware of; people have many choices of products now, however not many people can afford diverse and convenient items at this time. One of his assistants, Anna, was able to provide some interpretation as we discussed his business and the objectives of our trip. We sent a FAX to USA from his office.

They joined us for dinner at our hotel where we presented some gifts to them in honor of their excellent job of hosting us. Professor Djangaliev and Dr. Smuryghin arranged the connection with Mr. Elizarov.

Sep. 9 - We departed for the domestic airport (Domodedovo) which is two hours south of Moscow center. Mr. Elizarov's driver escorted us through a maze of bureaucracy to board our Aeroflot flight to Alma-Ata. We were charged $76 (USA) for excess baggage. We met many other American travelers, most on religious missions. After surviving the greasy Aeroflot food but otherwise comfortable 4.5 hour flight, we arrived in Alma-Ata at 9:30 p.m. and were met by Prof. Djangaliev, Dr. Smuryghin, Saule (our interpreter, a 23 year old young woman studying physiology at Alma-Ata University), and Prof. Djangaliev's driver.

They drove to our Alma-Ata headquarters, a sanitarium (SAVO) which was formerly used by military Generals for R and R. It is now used for civilian R and R. We had very large suites with one drawback, no hot water. However we had a kitchen to heat water for tea, etc. After arrival, our host at 'SAVO' had dinner waiting. It was a tasty meal of chicken, and fresh fruit, vegetables and Kazakh wine. We made plans for our expedition

which started the next morning.

Personnel: 1) Professor Aimak Djangaliev, Academy of Sciences Republic of Kazakhstan, Main Botanical Garden, Head of the Interbranch Laboratory for the Protection of Germplasm Repository and Introduction, 187 Tulabaev st. Apt 11, Alma-Ata 480064, Kazakhstan, Tel. 3272-62-07-19, FAX 3272-62-07-19.

2) Dr. Alexander Smuryghin, General Director, Research and Production Association, Kazakh Research Institute of Fruit Growing and Viticulture, 238 A. Gagarin Ave. Alma-Ata, 480032, Kazakhstan, Tel. 3272-(48-20-33 or 48-28-90).

3) Ms. Saule Dusembina, Furmanov St. 172-71, Alma-Ata 480091, Kazakhstan, Tel. 3272-69-55-79.

Sep. 10 - At 9:00 a.m., Prof. Djangaliev and his wife, Tatiana Salova and Saule met us at SAVO. Some of our bags accompanied Tatiana back to their apartment so that we didn't have to carry everything on the helicopter. We left a FAX for her to send to USA and departed Alma-Ata at 10:00 a.m. via helicopter. Prof. Djangaliev collaborates closely with the Ministry of Forestry which arranged the use of the helicopter on a rental basis for entry into remote forest regions. The helicopters used were 12 passenger, 5 crew capacity. Appendix 3 shows Kazakhstan in relation to the rest of the former USSR and shows general expedition sites out of Alma-Ata. Appendix 4 shows the helicopter routes that were used. Our first expedition was Northeast of Alma-Ata about 450 miles near the village of Topolevka in the Dzhungarsky Alatau (mountain range). Appendix 5 contains the detailed maps of each expedition, Map A was the region where we first arrived. Appendix 6 (Table 1) lists the six basic areas that were covered with the dates and site numbers for collections summarized. Attached are photos 1-5 depicting some of the sites covered. Immediately upon landing at Forestry camp #16 in the Taldy-Kurgan region, the GPS was used to measure our coordinates. Appendix 7 lists all coordinates measured for each collection and camp site and also lists elevations. This table (Table 2) can be correlated with the maps in Appendix 5 and with Table 1 (Appendix 6).

Upon arriving at the Camp we were met by Head Forestry Officer, Ivan Ovchinnik, and assistants Algys Suleimenov, Nigmat Kuzunbaev and Aiken Burungazov. In addition we met Leonid Butenok, Prof. Djangaliev's assistant, who was to stay with us every day until departure on Sep. 27. We also met Botanist, Raisa Turehanova, from Alma-Ata who studies wild fruit that grow in association with *Malus*.

During the helicopter ride, we were able to take some excellent photos and videos of the wild apple forests which were visible for much of the area between Alma-Ata and Topolevka. However, as

we approached the camp, it became apparent that we were in a remote area where the forests are not declining as rapidly as the area closer to Alma-Ata. Photo #1 in Appendix 6 shows an overview of the camp and the forest as taken from the helicopter. In addition, activities of the camp (meal preparation) are shown.

Arriving at 12:30 p.m., we were shown our sleeping headquarters. We had a clean bunkhouse with clean linens on soft, saggy, but adequate cots. Facilities included an outhouse with a hole in the floor (a sanitary alternative to some facilities we would see later). Water was carried to the camp in cans from a nearby mountain stream. Power for lights was provided by a gasoline generator turned on at dusk. Personnel at the camp included, besides those mentioned, an entire crew including a camp foreman and his wife, the head cook, along with a hard working daughter with two young children. In addition, there were two other women assistants and five or six men who assisted with driving and activities of the camp. Nearly all were native Kazakhs who had never seen foreigners. All meals were cooked outside with primitive wood burning equipment. There was one sheltered lean-to that housed the stove where bread and other items were prepared. The first meal was a foretaste of what was to follow. We were served huge portions of meat throughout our stay, mostly mutton and lamb. However, there was always a large assortment of breads and fresh fruits and vegetables. We particularly enjoyed the homemade wild raspberry and strawberry preserves at this site. In addition, vodka and cognac were served with every meal except breakfast. It was necessary to make our point early on that Americans cannot tolerate large volumes of alcohol and expect to accomplish the task at hand.

After lunch, the first expedition for collection of apple was initiated in a $2km^2$ area west of the camp where there was very little change in elevation. Appendix 6 indicates that 8 sites were collected on this date and photo #2 depicts the expedition team in action. E. Dickson kept the site records; D. Noiton provided the fruit evaluation remarks; P. Forsline evaluated site parameters and recorded GPS data; and G. Mink examined trees and fruit for plant pathogens and recorded site activities on video film. The site data and plant data are observed in Appendices 8 and 9. The total numbers of apples collected are summarized in Appendix 10. Other species collected are summarized in Appendix 11 which also indicates that we made collections of hops (*Humulus*) and hawthorne (*Crataegus*) on this date. *Malus sieversii* was the dominant species observed on the first expedition. Unfortunately as the summary discusses, there was a severe spring frost in this area at the time of bloom. Therefore we could not sample populations but sampled as much fruit from each tree as we could find. Fruits in this first area were yellow. In addition we found two sites with *Malus baccata*, a very cold-hardy species, that is found mainly in the Altai area

of Siberia which borders on the north of Kazakhstan.

Prof. Djangaliev and colleagues have studied *Malus sieversii* and *Malus kirghisorum* in this area for decades. The expedition on this day was to his block 19/department 22. Two of his labelled trees were sampled on this day (Appendix 9, plant #s 01/01 and 03/01). Through his work, he has prepared maps of each of these sites that tracks the health of these forest through the years. He has published a book, "The Wild Apple Tree of Kazakhstan". It is written in Russian and it would be good if we could have it translated into English. In addition he has selected some superior forms, for breeding purposes. These were collected later during our travels, as listed in Appendix 9 in sites 31-35. Forms 28 and 1037 were brought to the USA as scions in 1989. The other forms were brought to USA as cuttings on this expedition. This particular region has been very minimally disturbed as it is quite remote from habitation as noted on map A in Appendix 5. This area is a national preserve where no hunting or collecting is allowed. Daily, we saw evidence of bear, deer and wild boar. We were always accompanied by a person with a rifle for protection.

On this and other expeditions, our 4-person team was accompanied by three to six individuals at all times to assist with botanical identification and the physical aspects of collecting. On short expeditions such as this, Prof. Djangaliev, who just turned 80 years old, accompanied us and discussed aspects of his research on site.

As usual, each day we returned on foot to the campsite and received an excellent supper. We were treated like royalty in that setting. Each dinner was a long event that involved numerous exchange of conversation through traditional Russian toasts with vodka and cognac. Each evening after dinner, we recruited the help of the staff, sometimes as many as six to remove seeds from fruit. This activity was usually conducted in a yurt (traditional Kazakh house). With the desire to accomplish these tasks each evening, our team had to minimize the ingestion of Vodka. We couldn't afford to have a backlog of fruit without seed extraction from one day to the next as each day more was collected.

<u>Personnel</u>:

1) Leonid Butenok, Botanical assistant, Palladina St. 147, Alma-Ata 480091, Kazakhstan.

2) Raisa Turehanova, Botanist, Main Botanical Garden, Timiriazev St. 480070, Alma-Ata, Kazakhstan.

3) Ivan Dimitrievitch Ovchinnikov, Senior Forestry officer., Taldykorgan Orman Sharuashiliginan, 1-29-67, Kazakhstan, Tel.

3272-2-19-28.

4) Nihmadjan Hakimjanovitch Kuzubaev, Senior Officer of the Sarkand Forest, Kdzansugurova St. 52, apt 1, Taldy-Korganskaya obl. Sarkandskii r-n, Sarkand 489230, Kazakhstan

Sep. 11 - On this beautiful sunny morning, we rose at 6:30 a.m. and prepared ourselves for a longer hike east of the camp. That necessitated that we had our packs ready including some filtered water. The camp crew carried bread and tea for stops along the way. Breakfast was always served before departure. This expedition stopped at sites 9-13. We increased our elevation by 100 meters from where the camp was located. Besides collecting *Malus sieversii*, we made another collection of hops. The forests on this expedition were somewhat different in that we were near an active mountain stream fed by snow melt from the Dzhungarsky mountains. These forests were in the foothills of mountains 5000m tall. We were in forests where *Malus* was mixed with fir and populus. Again we collected in areas where the forestry project had identified certain trees. Our sites 09, 10 and 12 were located in their departments 17, 16 and 15 respectively. Again most of the fruits were yellow but we did find our first red-fruited tree (Plant #09/01, App. 9). In disturbed areas along trails, red clover was common. Interestingly, these plants exhibited no virus symptoms.

Upon return to the camp in the late afternoon the camp staff drove us down to the river (10km) by rough jeep trail to a Russian bath. There we were refreshed by the hot steam bath and 'beaten' with fresh fir and birch branches. This was followed by a quick dip and bath in a cold mountain stream. This renewed our energy for a traditional Kazakh dinner of meat dumplings (Monti) and freshly-caught mountain trout. As usual, dinner was followed by seed extraction in the yurt.

Sep. 12 - This was the only rainy morning on our trip. Drizzle delayed our expedition until noon. However, our medical supplies came in handy as E. Dickson had a small thorn imbedded in her eye lid from the expedition on the previous day. We were able to remove it with some difficulty using a small forceps and treat her eye with topical antibiotic that was packed. We were elated that we did not have to rely on local village medical technology. This shortened expedition took us to the south of the camp where we collected the first of *Malus kirghisorum*. To the expedition team, this species appears to be no different than *Malus sieversii*. Prof. Djangaliev described it as evolving on sites where the soil drainage is poor.

Sites 14-19 were collected from a valley east and south of camp. Descriptions are given in Appendices 8 and 9. By now, many of our site records were recorded on audio tape and transcribed to record sheets in the evening during seed extraction activities.

Most of the trees in this area were heavily infected with apple scab on both leaves and fruit.

Sep. 13 - The final expedition from the Topolevka forestry camp departed at 7:00 a.m. We set out on foot southeast of the camp from our elevation of 1300m at the camp to our destination at 2010m at the top of Mt. Mushambai. The view from the top was superb as we looked back toward camp and further east to the high peaks of China. This is the elevation limit for apple at this latitude. This was the most physically taxing expedition of our trip, but it was helpful to have the forestry assistants carry many of our things. During our descent, collections were made at sites 20-24 which also included some *Ribes* and *Sorbus*. Collections on this expedition are depicted in photo #3 of Appendix 6. Apple trees were very rare as we climbed above 1700m and trees were very dwarfed as a result of being in this ecosystem. Unfortunately, nothing was fruiting at these elevations, but we did collect some scions from a typical *Malus* tree at 1780m (site 21-01). In this area we observed many apple trees that propagate from rootsuckers. Therefore there were many clumps of cloned apple trees in the area. The apples collected at site 24-01 were the most attractive apple that we saw (similar to the New Zealand variety 'Gala'). They are depicted on photo #3.

No aphids were observed on any plant during our four days here. The paucity of aphids is reflected in the lack of virus symptoms on red clover and vetch plants throughout the area

By mid-afternoon, we returned to the camp for our final meal there and said farewell to the camp staff and presented token gifts to many of them. Following, we loaded the jeeps and drove by dusty, rough road to the next village to the northeast (30 km), Lepsinsk (see map A/B). We were accompanied by Prof. Djangaliev, Saule, Leonid, Ivan and two drivers from the Camp. We were housed in a bunkhouse within the village (fenced-in area). The accommodations were comfortable, but again, no indoor plumbing.

The director and his assistant of this forestry region accompanied us to dinner in a town cafe. I do not have record of their names. We were the only patrons at the cafe. The village was very primitive with cows roaming freely, haystacks in backyards and severely-pot-holed dirt streets. The main industry in town, a canning factory was moved about 2-3 years earlier.

Sep 14 - After breakfast, we took the jeeps 15km southeast of the village to the Black River Forestry camp where collections were made (sites 25-30). Besides apple we collected *Ribes*, *Rubus* and *Crataegus*. The forests were somewhat different in this area with more undergrowth in sites 25 and 26. Perhaps more moisture falls in this area. We observed several chokecherry trees in this

area. All had green, healthy leaves indicating probably no 'X disease' mycoplasma in the region. Many *Malus* trees around Lepsinsk were defoliating badly as a result of an undetermined disease or environmental stress. In this area, we encountered two honey producers who let us taste their ware. We stopped at the forestry camp where three local forestry officers had an outside-prepared meal waiting for us.

After lunch, we moved a bit further to the southwest in a heavily grazed area and made collections (sites 27-30) along Dudakalova ridge. Again in this area, the trees were quite stressed. Virtually all *Malus* trees were 50-95% defoliated. Leaf symptoms consisting of tan necrotic areas surrounded by a thin brown band of yellow chlorosis suggest the presence of a bacterium or mycoplasma. These necrotic spots appeared to start as discrete necrotic spots and enlarge down the edges of the leaves, eventually covering 75-90% of the leaf. No fungal-like bodies were seen and no symptoms appeared on the fruit. These symptoms were not seen in the Topolevka area. Some of the leaves were carried back to the USDA/ARS/NAA Foreign Disease-Weed Science Research Unit in Frederick, MD. Dr. Norman Schaad, Research Leader there found no bacterium. However, *Venturia* was isolated and is still under investigation (personal communication with Dr. G. Mink, December 6, 1993).

In addition, a low-growing *Rubus* that was fruiting late in the year was collected in this area.

We returned to the village for one more night and were treated to another Russian bath followed by an excellent dinner of fried mountain trout. Following some exchange toasts, we had a long evening of extracting seeds in preparation for our helicopter-return to Alma-Ata the next day.

Sep. 15 - After breakfast at the village cafe, we boarded the helicopter (photo #5, Appendix 6) at 10:30 a.m. for a very scenic ride back to Alma-Ata. This crew took us through some spectacular mountain passes and canyons and across glaciers in the Dzhungarsky range within 30km of the Chinese border. We stopped in the city of Taldy-Korgan to refuel and arrived in Alma-Ata at 2:30 p.m. After checking in to the sanitarium (SAVO), we went to the office of Vladimir Stepanov to make our only calls home during the trip. Calling from Kazakhstan is a 1-2 hour process since you have to reserve ahead and wait. We found the first aphids of the trip on roses near the entrance to our hotel.

Personnel:

1) Vladimir I. Stepanov, First Deputy Chairman for Forestry of the Republic of Kazakhstan, Zheltoksan St. 112, Alma-Ata, 480091, Kazakhstan. Tel. 3272- (62-41-79) (62-61-15)

We visited with Mr. Stepanov for 10 minutes with Prof. Djangaliev to describe our objectives.

Sep.16 - This was a day to meet with top-level administrators in Kazakhstan.

Personnel:

1) Rakhim A. Urazaliev, Vice President, academician, Kazakh Academy of Agricultural Sciences, 79 Abylaikhan Avenue, Alma-Ata 480091, Kazakhstan, Tel. 3272-(62-52-24)(62-88-07)(FAX 62-38-31). He is a plant collector in forages and vegetables and is responsible for developing the Kazakh genebank. He has had contact with programs in Sweden and UK.

2) Svyatsolav A.. Medvedev, Minister, Ministry of Ecology and Bioresources of the Republic of Kazakhstan, 106 Paniflov St. Alma-Ata 480091, Kazakhstan, Tel. 3272-6312-73, FAX 3272-63-52-44

3) Madi Abdoshevich Kireev, Deputy Minister, Ministry of Ecology and Bioresources of the Republic of Kazakhstan, 106 Paniflov St. Alma-Ata 480091, Kazakhstan, Tel. 3271-(63-12-24) (64-72-39)

4) Alexander K. Amanbayev, Chairman, Committee for Forestry of the Republic of Kazakhstan, 112 Zheltoksan St. Alma-Ata 480091, Kazakhstan, Tel. 3272-62-63-20.

We met with these individuals jointly to discuss agriculture and forestry of Kazakhstan. The expedition team members each gave short presentations of their work and passed out brochures. Mr Amanbayev is one of the scientists listed in Appendix 2 who visited the USA in October. He worked closely with Prof. Djangaliev and Mr. Kireev on the logistics of hosting our expedition team.

The remainder of the day was spent on R and R, shopping and touring a museum.

Sep.17 - We packed our bags and set out on an expedition in the apple forests northeast of Alm-Ata. These areas can be seen in maps C/D in Appendix 5. We stayed for the night at a retreat ('The Composer's house') near the village of Turgen. This is where the famous Russian composer, Prokofiev, spent some time. On the way we stopped at the Kazakh plant quarantine site near the village of Talgar where new introductions were observed in an isolated field site. Prof. Djangaliev showed us some of the 500 apple genotypes that he had introduced from the NGR in Geneva, NY. No official indexing for viruses is done. The plants are only observed under the direction of Vladimir Vasilivitch with a staff of nine. Apple, pear, stone fruit, walnuts and berries are introduced and observed. If the disease,

'plum pox' is observed, the clone is destroyed. 'Plum pox' is observed mostly in *Prunus* from Bulgaria. A sweet cherry selection from Germany was observed which expressed symptoms typical of those caused by 'Little Cherry Virus'. Most of the pear introductions expressed symptoms of 'Pear Vein Yellows Virus'. No virus symptoms were observed on apple clones.

We then moved on to the Arboretum in Issyk. and met with the director, Karib Abdulovich Ismailov. This arboretum has 60 species of *Crataegus* and we collected one large fruited type (site 31-01). We also collected some *Vitis* and *Ampelopsis* species (sites 31-03,04,05,08). In addition Prof. Djangaliev had some of his apple forms there that we received seeds and cuttings of (sites 31-02,06,07).

Following, we traveled to the collection site in the Kamenka gorge, part of the Zailiskiy Alatau. This is near the area where the 1989 collection team travelled. They were in a neighboring gorge called Kusnetzov. After unpacking our things and checking into the 'Composer's House' (4:00 p.m) we went on a short expedition to collect (site 32). Here we saw wild apple and apricot in association. The apricot trees appeared to be very healthy, but again, very few of the apples were fruiting due to the spring frost. This region sees only 50cm of snow per year but temperatures are often near -30°C.

<u>Sep. 18</u> - We left the 'Composer's House' and drove to Dr. Smuryghin's biotechnology lab at the State Farm. There we observed his tissue culture propagation of grapevines, the farm winery, and controlled atmosphere storage facility for fruits. It is a very efficiently run program. With their cold winter temperatures, *Vitis vinifera* grapes are laid down and covered with soil each year.

Three other forms of apple (sites 33-35) were growing at the state farm. Scions were collected for carrying back to USA.

We drove back to Alma-Ata and had dinner with Prof. Djangaliev and his wife, Tatiana, at their apartment. As listed in Appendix 2, she is one of the scientists that visited USA in October.

<u>Sep. 19</u> - Gaylord Mink departed by Aeroflot from the Alma-Ata airport. He needed to get back to USA for his IR2 advisory committee meeting. The remainder of the team accompanied Tatiana on a short expedition 15km east of Alma-Ata (Kotur Bulak Gorge) while Prof. Djangaliev and L. Butenok accompanied Dr. Mink to the airport. Tatiana specializes in the study of wild apricot. This area is the northernmost range of wild apricot. There were many apples in that area mixed with the apricots but we found none fruiting. She showed us some maps that compared forests in this area presently with those in 1960. Nearly 80% of the forests

have disappeared in that period of time due to human pressures. Since we found no fruit in this area, we drove by jeep further southeast, moving from 1100m to 1680m. There we found some very healthy wild apples fruiting in a grazed area (site 36). We drove northeast of there to the Delbulak area near a stream and found large populations of apple (el 1430 m), but nothing was fruiting.

We returned to Alma-Ata and boarded the overnight train (6:00p.m) for Chimkent (Appendix 4). We were accompanied by Prof. Djangaliev, L. Butenok, Saule and Kayrat Ustemirov (a young administrator in the Ministry of Forestry who arranged the remainder of our expeditions). He is from the same office as Mr. Amanbayev (listed earlier). We had sleeper compartments on the train and rested quite well, arriving at 9:00 a.m. the next day.

Personnel:

1) Kyrat Ustemirov, Forestry Committee, Zheltoksan st. 112, Alma-Ata 480091, Kazakhstan, Tel. 3272-69-60-85

Sep. 20 - We were met by an entourage of drivers at the train station in Chimkent who drove us one hour by automobile north of Chimkent. There we were met by people in three jeeps that transported us another hour over the dustiest, bumpiest roads any of us had ever experienced. Some of us held cloth filters over our faces to avoid breathing all the dust. I would pack a box of dust face masks for future trips to this area. We drove through desert wasteland and wondered where we would see vegetation for collecting. We arrived at another remote forestry camp in the Boraldy region of the Karatau Mountains (map E in Appendix 5). There is an active stream running through the camp but the mountains are only 2000m in this area with no snow pack. The stream is fed by springs and is bordered by lush vegetation.

Personnel at this site:

1) Genisbek Turganov, General Director of the Chimkent Regional Forest. He was our host at this camp making, all of the local arrangements.

2) Serik Serikbaev, Director of the Boraldy Forest

3) Rahman Isetbaev, Forestry officer of the Boraldy forest

- In addition there was a camp staff (6-8) including drivers and cooks. There were 4 children also in the camp.

Scientific Staff to assist us included:

4) Vladimir Kolbintsev, Senior Science Worker (Specialist in

rare and endangered animals) of the Aksu-Jabagli Nature Preserve, 487964 Jabagli v., Tulkubas District, Chimkent region, Kazakhstan

5) Sergi Mikhailovitch Haitoritch, Kuratov St. 2b, Alma-Ata 480015, Kazakhstan

6) Anna Andreevna Ivashenko, Botanist, Main Botanical Garden, Department of Natural Flora, Alma-Ata ---(home address- Kotem - 2, house 11a, apt 27, Alma Ata 480070, Kazakhstan, tel. 3272-53-11-25.

We arrived at the camp at 12:30 p.m. and had lunch while discussing our expedition plans. This is a very unique ecosystem which is very xerophytic except for the stream running through it. It receives only 350mm of precipitation annually and has some extremely hot weather near 45°C daily in summer with an average high of 40°C. Winter temperatures approach -30°C.

After lunch we climbed the dry hillside northwest of camp from 920m to 1200m. The top part of photo #4 (Appendix 6) shows the creek 300m below the spot of the camera. All collections from the dry hillside are site 37 and listed in Appendix 11. No apple or grape were collected although we did see some small apple trees in this dry area that were not fruiting. The *Crataegus* was very unique in that the fruits were large and very edible. Although we observed many Pistachio on this expedition, all fruiting types were invaded by moth larvae in their fruit. Other Pistachio were collected later by the camp staff as described in site 41. This is the northern limit of Pistachio and with the climatic extremes, may have some unique features.

This expedition was very taxing physically as the weather was hot and dry. Some of the team members were somewhat dehydrated. The electrolyte solutions that we carried were useful. It was also helpful to have Vladimir with us to assist in describing the many unique species that we encountered. Anna Ivashenko was unable to join us this day because of a severe toothache. We provided her some Erythromycin and Tylenol with Codeine. She was able to join our expedition the next day.

Upon returning and rehydrating ourselves, we had an excellent meal served in the yurt, while seated on the floor padded and decorated with beautiful Persian rugs. A refreshing bath in the clean cool mountain stream after another Russian steam bath refreshed all of us. The sleeping accommodations were a cot in the bunkhouse or a cot in the open air. We chose the bunkhouse, but in hindsight wish we had chosen the open air. The clear nights were brilliant in this desert area where no light pollution occurs. In addition, scratching rodents in the bunkhouse kept some of us awake.

Sep. 21 - We started out for our expedition along the stream by driving 3km upstream to the campsite of Vladimir, Sergi and Anna. From there we followed the stream by foot 10km northwest of the camp and made collections along the way (sites 38-40). We were pleasantly surprised to find an abundance of wild *Vitis vinifera* in this harsh climate and isolated area. We found black, red and white types. Most had excellent flavor and high sugar contents. In addition others had other positive traits such as crisp texture and large loose clusters. The large loose clusters are important as a trait in breeding to minimize disease occurrence. An example can be seen in photo #4, Appendix 6. When we reached the area 10km upstream we stopped at an underground spring which feeds the river, drank water, made tea and fried fish that Sergi had caught by attaching grape berries to his hook and line.

Some other collections in site 38-40 were also made as listed in Appendix 11. In addition we found one fruiting *Malus sieversii* (site 39-11) along the stream. While we were along the stream, the camp crew, under the supervision of Prof. Djangaliev, collected other apples south of the camp along with some pistachio (site 41). This was a very exhausting but productive day, but we still had to extract the grape seeds that evening (a messy job). We took another Russian steam bath before starting on that project.

Sep 22 - Again we listened to rodents in the bunkhouse all night as they were attracted to extracted seeds in our rooms. There was some confusion as to whether we were approved to helicopter to Kyrgyzstan on this day as we heard rumors about the Kazakhstan border being closed due to Cholera. Mr. Turganov, left for Chimkent the previous evening to determine if we were to meet the helicopter two hours away in Chimkent or whether it would come to the camp directly. He had not arrived back to the camp to relay the message, therefore we continued to extract grape seeds with help from the camp staff. Then it was decided to pack up quickly and leave at 10:00 a.m. by jeep to Chimkent. I anticipated this might happen, so everything except the grape seeds (extracted and unextracted were packed). There was discussion that we would stay two more days at this camp if the Kyrgyzstan trip was called off. We would gladly have done that as this was such a fascinating ecosystem and we still had other areas nearby to collect. We drove 45 minutes back on the dusty trail and met Mr. Turganov's messenger. He told us to immediately turn around and head back to camp. The helicopter would pick us up there. Therefore, we rode 45 minutes back to camp on the same dusty trail. We just had time to filter some water for our canteens for the three hour helicopter ride and it arrived. We finally left the camp at 11:30 a.m.

We could see only desert surrounding our camp as we left. Indeed the area where we had just collected was an isolated unique

ecosystem. Most of the rugged mountains on the ride to the Ferganskiy range in Kyrgyzstan were bare of vegetation. We stopped to refuel in Torkent. Only 15 minutes from destination (Appendix 4 for helicopter route) did we see vast forests. These were dominated by walnut with apple and pear associated. We landed at our campsite in the little village of Koumhama about 80km north of Dzalal-Abad. The scenery in this site was incredible. The colors of the 5000m peaks in the Ferganskiy range reminded us of Yosemite in California with the green walnut forests in the foothills (map E, Appendix 5 and photo #5, Appendix 6). We were met by Mr. Ashimov and Mr. Artikbaev.

Personnel in Kyrgyzstan:

1) Kamil Satarovich Ashimov, Director of the Experimental Station of Southern Kirgizian Forestry of the Academy of Sciences of the Republic of Kyrgyzstan, Uzbekistanskaya St., 130, Sputnik Region, Dzalal-Abad, 715611, Republic of Kyrgyzstan.

2) Tolonbai Artibaevich Atikbaev, Director of Kirgovsky Forestry

3) Aman Samutdinovich Cherikov, Guide.

4) Bronislav Ivanovich Venglovsky, Director of the Institute of Forestry and Walnut Breeding, Bishkek, 720015 Kyrgyzstan Otdel EESA app. 4, Tel. 279082 or 271126.

5) Oleg Victoroich Kolov, Associate Director of Forestry and Walnut Breeding, Bishkek, 720015, Kyrgyzstan, Tel. 279187.

6) Igor Victorovitch Lukashevich, Candidate of Biological Sciences (Biochemistry), Institute of Forestry and Walnut Breeding, Biskek, 720015, Kyrgyzstan.

We checked into our bunkhouse immediately which again was comfortable. We had indoor plumbing with cold water only. It was not nearly as sanitary as conditions in the camps of Kazakhstan where we used outhouses. The helicopter crew checked into the camp with us this time to transport us over the next two days from site to site.

We immediately left by helicopter to observe a representative forest and met at our first stop, Drs. Venglosky, Kolov and Lukashevich who discussed this ecosystem with us. There were also 100 curious village children who surrounded the helicopter and the strange Americans. This area was organized as a protected forest (630,000 hectares) in 1946, but they just found out that the Kyrgyzstan government has mandated the harvest of valuable walnut wood products for income. Rainfall averages 1190 mm/yr. Average winter minimum is -16°C with coldest on record of -23°C. Spring frosts are common; they had -6°C in May 1993.

Calvin Sperling also collected

Therefore apples were sparse this year in this area as we found in Kazakhstan. *Juglans regelii* dominates with *Malus kirghisorum, Pyrus regelii, Prunus sogdiana, Crataegus pontica* and *Vitis vinifera* (black fruit types at 1750m) in association. Vavilov called this one of the sites the origin of the cultivated apple.

After these discussions, we boarded the helicopter with our scientific hosts and stopped at site 42 (northeast of the village) to make 6 apple collections. This was a heavily grazed area and fruiting from tree to tree was sparse. After this collection we returned to the bunkhouse for dinner and more seed extraction. We were able to finish extracting the grapes from Kyrgyzstan with help, even from members of the helicopter crew.

Sep. 23 - Professor Djangaliev came to the breakfast table and told us of storm warnings in the area. We made the decision to return by helicopter today instead of Sep. 24 as planned. The helicopters cannot fly in the rugged passes without clear visibility. Therefore we quickly packed our things and boarded the helicopter with all of our hosts and made 2 collection stops (rapidly). Indeed, the clouds had started to move in. Sites 43-45 were collected west of the village and included *Malus, Pyrus* and *Juglans*. We had intention to collect much more walnut since Drs. Thompson and McGranahan had to cancel their planned trip to Kyrgyzstan in 1993. There was a wealth of material there and we were with the local experts, Drs. Venglovsky and Kolov.

We had time to make one more stop (sites 46,47) via helicopter further west of the village. This included only collection of *Pyrus*. At noon, we said farewell to our wonderful Kyrgyzstani hosts after the short visit and headed northeast to outrun the storm (Helicopter route, Appendix 4). We stopped in Torkent to refuel and headed east. It was apparent we were going to have problems as the clouds were rather low. Out of Buraldy, the crew attempted to fly the passes through Zailiyskiy range into Kazakhstan but were forced to turn around. We landed in a field near Buraldy to discuss options. Two local farmers came out of curiosity as snowflakes started to fall. We thought surely we would have to camp in the helicopter for the night. The crew suggested taking us northwest in the low valley to Bishkek (capital city of Kyrgyzstan). Instead they offered to fly us to Dzambul, Kazakhstan to catch the 1:00 a.m. train back to Alma-Ata. Professor Djangaliev convinced them to stop in Georgiyevka (now in Kazakhstan) to try to phone someone in Alma-Ata to come by auto to drive us. The phone system didn't work. We observed at this time our Kazakh hosts provided some dollars to the crew to fly us directly to Alma Ata. We were out of the danger high passes at this time. We arrived to Alma-Ata at 5:30 p.m., two and a half hours later than expected, exhausted from the anxiety of the flight. Prof. Djangaliev invited us to his apartment where Tatiana had a hot meal and hot shower waiting.

We checked into our sanitarium (SAVO) again for the remainder of our stay.

Sep. 24 - D. Noiton, E. Dickson and P. Forsline, the remaining team members worked on seed extraction, seed washing and packaging until 1:00 p.m. After lunch we accompanied L. Butenok, Prof. Djangaliev, Tatiana and Saule to the Alma-Ata Botanic Garden where each of us gave 25 minute seminars to the Botanic Garden Staff.

Personnel:

1) Prof. Isbasar R. Rachimbaev, Director, Main Botanical Garden, Academy of Sciences Republic of Kazakhstan, Timiriazev St. 480070 Alma-Ata, Kazakhstan, Tel. 3272-4776692, FAX 3272-696116.

2) Sergy V. Chekalin, Vice Director, The Main Botanical Garden of the Kazakh Academy of Sciences, 480070 Alma-Ata, Kazakhstan, Tel. 3272- (445733 or 623452).

Following our discussions, we stopped in the lab where L. Butenok and Raisa Turehanova were preparing and drying our herbarium specimens. We left instruction on how we would carry them back to USA.

Following, Prof. Chekalin, who speaks quite good English, gave us a tour of the Botanical Garden. This is the main garden. There are five others throughout Kazakhstan representing different ecosystems - 1) North, 2) Central, 3) South, 4) Caspian area (West) and 5) 'another?'. There are 800 species in Kazakhstan including 200 conifers. They are breeding lilac, rose, lily and freesia.

To complete the day we were taken to see Medeo, the famous speed-skating rink and arena (hosts international competition) that sits at the base of snow-capped peaks just east of the city. It appears that this city would be a natural to host the Winter Olympics sometime.

Sep. 25 - We travelled to Dr. Smuryghin's State Farm Lab again where he gave us cuttings of 10 *Vitis vinifera* cultivars that are commonly grown in Kazakhstan (Appendix 9, site 48). From there we travelled one and a half hours further to the northeast where we spent the afternoon treated like royalty at the hunting lodge of Dr. Smuryghin's. We had a 5-course meal that lasted five hours. It was all prepared as an outdoor cookout. Fresh fish and freshly slaughtered lamb was prepared gourmet style. After the third course we relaxed with another Russian steam bath with the fir branches. The meal was topped off with the best marinated Shaklish (shish-kebob) that any of us have ever had.

Sep. 26 - Dr. Noiton departed from the Alma-Ata airport for return trip to New Zealand. She carried 75 seeds of each of the *Malus* accessions that were collected. These will be evaluated in New Zealand and used in their breeding program. Data will be returned to the NPGS database.

E. Dickson and P. Forsline were invited to L. Butenok's home where his wife cooked an excellent Kazakh/Russian meal. We worked with Leonid to pack all of the herbarium specimens in P. Forsline's baggage for transport to USA.

We returned to SAVO at 6:30 p.m. to organize all plant material for transport to USA. Seeds were packaged and counted after drying and summaries were prepared so that APHIS officials at JFK airport in New York could process quickly.

Many of our excess personal items, clothing and medications were left with various members of our host team so that we would have more room for packing plant material. They were very appreciative of receiving these items that are at times in short supply in their country.

Sep. 27 - E. Dickson and P. Forsline departed from Alma-Ata 10:00 a.m. via Aeroflot and were seen off by our gracious hosts, Prof. Djangaliev, L. Butenok, Saule and Tatiana.

We arrived in Moscow at 1:00 p.m and were met again by S. Elizarov who took us to the Hunter/Fisherman Hotel for one more night in Moscow. Final preparation of plant material for transport to USA was completed. E. Dickson began her extended stay as hosted by Igor Smirnov of the Main Botanical Garden. She visited the Moscow (Main) Botanical Garden, Horticulture Institute in Biruliovo and *Malus* taxonomist, Professor Ponomarenko at the Vavilov Institute in St. Petersburg, Russia.

Sep. 28 - P. Forsline departed from Moscow's Sheremetyovo airport at 11:00 a.m. after transportation by one of S. Elizarov's drivers. This was at the time of the political revolt in Moscow. We saw no evidence of the problems, in fact we were so isolated from the world the previous three weeks we hadn't heard of the problems until we arrived in Moscow. The mob at customs clearance at the airport was very unruly. If one were polite, he would never get through customs. There was no semblance of an orderly line. Each person had to push and shove for himself. Some of the pushing almost caused injury to people.

After arriving at JFK airport, all customs clearance was handled expeditiously. Within five days, all apple and grape seeds were delivered to the NGR at Geneva. Other species as listed on Appendix 11 were dispatched to other repositories by the Plant Introduction Office in Beltsville. Scions of apple and pear were

delivered to the Plant Quarantine Office in Beltsville and grape cuttings were shipped to Dr. D. Gonsalves, Cornell University in Geneva, NY for processing through Quarantine in cooperation with the Geneva NGR.

Following documentation of passport and accession records on GRIN, populations of apple and grape seeds were distributed to researchers for evaluation. The remainder were placed in storage at -18°C for long-term storage. Herbarium specimens were delivered to the Bailey Hortorium at Cornell University. Labelling and preparation of herbaria will be accomplished by E. Dickson and colleagues.

ACKNOWLEDGEMENTS

The participants appreciate very much the financial support that made this expedition possible. We thank the Apple CAC and its chairman Dr. Herb Aldwinckle for providing the support to P. Forsline in drafting the proposal for funding. We appreciate Dr. Calvin Sperling's efforts in rapidly circulating the proposal for review and for recommending the funding. We thank Dr. H. Shands for providing the funding through the NPGS. We also thank C. Sperling, H. Aldwinckle and E. Dickson (earlier exploration team) for establishing initial arrangements with Kazakhstan in 1989 to make this follow-up trip possible.

We express our gratitude to Professor A. Djangaliev and his wife, Tatiana, for hosting our team. He has a tremendous talent to work through difficult bureaucratic mazes to accomplish an expedition such as this. He was able to receive the cooperation of the Kazakhstan Government. We also thank his colleagues in the Kazakhstan Ministry of Forestry, particularly Mr. Amanbayev for his support. They were able to link with local forestry officers to provide accommodations and assistance at each site. They were also able to arrange helicopter transportation to remote sites. Without that convenience, the duration of the expedition in terms of area covered would have doubled and left us all exhausted.

Each key person in each site is acknowledged with title and address in the body of the report (listed under Personnel: on days when they were met).

Many others who helped in camps and villages whose names we did not obtain we also deeply appreciate (drivers, cooks, housekeepers and helicopter crews). The excellent humor of all the people may our exploration also very rewarding. It made our expedition the experience of a lifetime. We thank everyone for their care of our personal needs. We all stayed incredibly healthy. E. Dickson, who became slightly ill and had to leave

the team for 36 hours expresses her gratitude along with the team to L. Butenok for helping her find a doctor and allowing her to R and R in his home. We also give him a giant thanks for his botanical and physical expertise and for accompanying us on all expeditions including helicopter rides. Saule Dusembina, our interpreter was amazing in sticking by our sides for the entire three weeks. She deserved the one day of rest (Sep. 22) in the desert when Vladimir Kolbintsev (speaks good English) accompanied us on that grueling expedition day. We also thank S. Elizarov and his associates for hosting our complicated transport in and out of Moscow. In addition, Dr. Smuryghin made the contact with Mr. Elizarov and provided for many of the hosting details.

We also thank Dr. George White of the Plant Introduction Office for providing guidance and permits for transporting the plant germplasm to USA. He also arranged for personnel from APHIS to be waiting for me upon arrival at JFK airport.

I wish to express my sincere gratitude to two more groups:

1) The expedition team: a) E. Dickson for her taxonomic expertise and for preparing the site and plant information (Appendices 8 and 9), and for her continuing preparation of herbaria. b) D. Noiton for bringing her perspective as an apple breeder to the team and for her good humor as the team faced the challenges of refusing Vodka, and for her plans to evaluate the germplasm. c) G. Mink for his perspective on diseases of the wild material and for video taping so many events of the expedition. We can hardly forgive him for leaving us early.

2) Our West coast colleagues as listed in Appendix 2 who hosted the Kazakhs (also listed in Appendix 2) in October 1993. They played a key role in allowing more scientific and plant exchange. Their participation will allow broader exchange in the future between Kazakhstan, Kyrgyzstan and United States Scientists. At each of the sites they set up an agenda for the Kazakhs to meet relevant scientists in germplasm management, Horticulture, Plant Pathology, Entomology and Forestry. We also thank OICD, C. Sperling and D. Emerson (PGRU in Geneva, NY) for assisting in arranging this trip and the reciprocal trip.

RECOMMENDATIONS FOR FUTURE PLANT EXPLORATIONS

This expedition team was unable to collect broadly from the wild apple forests due to the reduced spring-frost induced crop load. Therefore, discussions are continuing with Professor Djangaliev about the possibility of a return trip to much of the same regions when we know that crop load is extensive. This will allow us to sample the entire diversity. This year we likely selected for frost-tolerance which also has many benefits. He and his colleagues are open to this possibility. We may need to be flexible in planning so that by the end of May in a given year, when frost danger has passed we could plan to leave on Sep. 1 to collect based on Kazakh scientists' assessment of crop load. The proposal this time would need to include payment to the Kazakhs for the actual expense of the expedition. Reciprocal visits are likely not practical in the future. The Apple CAC in consultation with Dr. Sperling will look at the possibilities for a return trip in 1995, 1996 or 1997.

In addition, we need to pursue the possibilities for collecting *Malus* in China. Contacts have been made with scientists in Yunnan and Sichuan. The NPGS has very little of the material endemic to that region which is rich in other species of *Malus*.

PLANT EXPLORATION IN THE REPUBLICS OF KAZAKHSTAN AND KYRGYZSTAN TO COLLECT APPLE GERMPLASM FOR CROP IMPROVEMENT

PROJECT SUMMARY

The Apple Crop Advisory Committee has determined there is a need for additional *Malus* germplasm from Kazakhstan and Kyrgyzstan. This germplasm is from the center of origin for the domestic apple and is needed to supplement the narrow genetic base presently available in apple. This germplasm will be useful for breeding programs for crop improvement and must be collected before it disappears. The germplasm will be incorporated into the U.S. National Plant Germplasm System where it becomes property of the U.S. Government and will be available to all qualified scientists/organizations, domestic and foreign, who are eligible to receive it. Since the interest is in wild material of the species that *Malus* x *domestica* arose from, seeds will be collected. Where appropriate some scions of local types will be collected. When appropriate, collections will be documented with voucher herbarium specimens. All collections will be documented with complete "passport" data (description, locality of collection, including latitude and longitude, etc.). All germplasm will be shipped or carried to the Plant Germplasm Quarantine Center, Beltsville, Maryland, from which it will be distributed according to policies in effect at the time of receipt.

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2. Objectives:

a. Taxa to be collected

The major species to be collected is *Malus sieversii* (Ledeb) Roemer, hypothesized to be the major source of *Malus x domestica* Borkh. (cultivated apple). Two other closely related species, *Malus kirghisorum* (Al. and Fed.) and *Malus niedzwetzkyana* Dieck (purported to be a red-leafed form of *Malus sieversii)* will also be collected with the assistance of Kazakh colleagues. The exploration team will have a secondary objective of collecting *Vitis* and other fruit spp. endemic to the Kazakhstan region.

b. Characteristics sought

The major goal will be to collect wild apple germplasm with as much diversity of morphological traits as possible. Fruit breeders are most interested in late-blooming types and types with high fruit quality. In addition, alkaline-tolerant and iron-deficiency tolerant material for potential rootstock development and disease-and insect-free material will be collected if possible. Collections from across as many ecogeographic sites as possible during the expedition will fulfill most of the goals of the mission.

c. Use of germplasm collected

The material will be deposited in the NGR in Geneva, NY and will be made available to cooperators for evaluation. Data on evaluations will be documented in GRIN. Research on

assessment of genetic diversity using biochemical and molecular techniques will be conducted with *Malus sieversii* seedling populations to compare to an array of *Malus X domestica*. These studies may help determine evolutionary history of the domesticated apple and assist in establishing new breeding strategies.

3. Dates of travel:

As planned in Appendix 1 (letters of invitation), departure from U.S. will be September 6, 1993 with travel to Alma-Ata. The expedition likely will begin sometime after September 8 to accommodate Prof. Djanagliev. To cover all areas identified in section 22, the expeditions will likely extend to Sep. 24. Departure from Alma-Ata will be near Sep. 27 with a short stop in Moscow, with arrival back in U.S. by Sep. 30.

4. Host country:

The collection will take place primarily in the Republic of Kazakhstan as hosted by Prof. Djangaliev (section 20). Alma-Ata will be travelling headquarters with separate expeditions southwest and northeast of the city over the time period. The area covered will be eastern Kazakhstan along the Kyrgyzstan and China borders. Various ridges and foothills in the Tian Shan mountains will be covered where Prof. Djangaliev and colleagues have become very familiar with the wild apple forests in their intensive research of the ecology of that area.

5. Suggested participants:

Section 1 lists the proposed participants. The vitae of each is attached in section 24. The four participants constitute an excellent interdisciplinary team.

Mr. Philip Forsline, as curator with 20 years of experience in pomology has knowledge of the present NGR collection and existing needs. He has travelled three times to various parts of Europe and has formed an acquaintance with Russian and European pomologists.

Dr. Gaylord Mink, an expert in viruses and other diseases in apple, will be an asset in assessing the disease status of the stands where collections are made. He has travelled throughout the world lecturing on virus detection and eradication in apple and is a member of the Apple CAC. He has worked on projects evaluating the NGR collection for virus sensitivity.

Ms. Elizabeth Dickson is the only returning member of the 1989 team that collected in Kazakhstan and neighboring Republics. Her thesis is being written on the taxonomy of North American *Malus*.

Not only has she collected apple germplasm in Kazakhstan, for her doctoral project, she has made systematic and nearly complete collections of the wild apple in North America. She has experience in collection and sampling strategies and has used the material in follow up evaluations. She has some familiarity with the Russian language.

Dr. Dominique Noiton will join us at her own expense based on an intense interest in the origin of the apple. She has a grasp of the Russian language, having translated many scientific articles on apple from Russian into English. As an apple breeder, she will be an excellent addition to the team and will survey the populations from a breeder's point of view. She has studied in France under Prof. Yves Lespinasse and recently entered the apple breeding program in New Zealand. She has extensively used germplasm from the NGR, obtaining seeds of elite material and using the offspring in a quantitative genetics-approach to breeding since quarantine rules in New Zealand prohibit large-scale introduction of clones. She worked for a period of time with the apple program in Geneva, NY. in 1991 and is an adjunct member of the Apple CAC.

Passport information:

Forsline - Place of birth- Minnesota, USA
- Date of birth - Sep. 3, 1944
- Official passport # 800696192 -U.S. (exp. 3/98)
  Personal passport # 062415247 -U.S. (exp. 7/99)

Mink - Place of birth- Indiana. USA
- Date of birth - Sep. 12, 1931
- Personal passport #-070978643 - U.S.

Dickson - Place of birth - California, USA
- Date of birth - Aug. 6, 1950
- Personal passport # - 062341520 - U.S.

Noiton - Adjunct member and New Zealand resident
- Place of birth - France
- Date of birth - April 5, 1959
- Personal passport # - 87AE84777 - France

6. Host country requirements re collecting and exporting germplasm:

From the previous experience of the collection team in 1989, and from discussions with the hosts, there are no permits required to collect and export germplasm. The exploration team will always be accompanied by the hosts during collection.

7. Justification:

Attached as Appendix 2 is the Joint Initiative for Cooperative Research developed October 19, 1992 at the time of visit to Geneva, NY by the hosts of the planned expedition. The Kazakh hosts recognize the uniqueness of the wild apple forests in their region. They have developed a protocol of intentions with Chinese colleagues in the neighboring Chinese province of Xinjiang. *Malus sieversii* is present throughout these areas in the Tian Shan mountain range. They have located some very isolated stands of wild apple that have likely not been collected and are developing plans to maintain *in situ* preserves in the area. They have studied the ecology of the forests in the area extensively and realize through ever-growing anthropological activities that many of these forests are threatened with degradation and disappearance. A map of the proposed expedition (Appendix 3) shows the distribution of *Malus sieversii* and where it will be collected. Areas 4,5 and 6 on the map include these more isolated areas that may represent untapped diversity of apple that may never have been collected or selected by man as the apple became domesticated. These areas are remote from the old silk-trade routes that purportedly served as conduits for the dispersion of apple over time. Areas 1,2 and 3 need to be covered as these areas are going through rapid economic/urban development.

The Kazakh hosts assured us that the political situation in Kazakhstan is quite stable. The situation in neighboring Uzbekistan and Tajikistan is politically unstable at this time. Fortunately, some collections were made in those Republics in 1989. The hosts will accompany the expedition team to Kyrgyzstan where the political situation is less stable than in Kazakhstan. They will inform us if there are any off-limits areas.

8. Germplasm currently available:

The 1989 collection near Alma-Ata and neighboring Republics returned 114 accessions of *M. sieversii* seed populations to the NGR in Geneva. Two clones (selections from *M. sieversii)* from that collection are still in quarantine in Beltsville, MD. Prior to that collection, the NGR had only 4 accessions of this species, and their origin is in question. The map (appendix 3) indicates that areas 1A-4A were collected in 1989. Areas 1-6

will be collected in 1993. The collection in 1993 will supplement that of 1989, but will not duplicate it since this species has a very broad range and has evolved in different ecosystems.

9. How does the exploration relate to earlier explorations or subsequent explorations:

As indicated in item 8, the collection map (appendix 3) shows the proximity of the 1989 collections (1A-4A) to the proposed 1993 collection (1-6). The northeastern areas (4-6) will be of greatest interest since the experience of our hosts indicated that these are very remote areas. The germplasm to be collected in these sites has great potential to extend the diversity of the previous collection and supplement what will be collected in areas 1-3.

Regarding any future collections in the area, it would be well to lay ground work for cooperation with the Kazakhs and the Chinese on this trip for a return to make collections on the Chinese side of the Tian Shan mountain range. Perhaps this may lead to a second follow-up trip among the three countries to Yunnan and Sichuan in south China where many other species of the genus *Malus* are endemic.

10. CAC concurrence:

Attached as appendix 4 are the minutes of the 1992 CAC meeting. The chairman of the CAC wrote an official letter of invitation (Appendix 1) to Prof. Djangaliev and colleagues to attend the 1992 CAC meeting. Appendix 4 presents a summary of the importance of collection in Kazakhstan. The PGRU and the plant exploration office assisted with the local travel expenses of the Kazakh visit and the CAC gave unanimous concurrence for a reciprocal collection trip to Kazakhstan. The NPGS will accommodate a second trip to U.S. for the Kazakhs (see budget, section 23) that will mainly be West Coast fruit repository and breeding sites, possibly in October 1993.

11. Status of mapping and map requirements:

The series of topographic maps for the collection area with detailed road listings have been obtained. These are those produced by the Defense Mapping Agency and have been obtained from the Hagstrom Map Company, 57 W. 43rd St., New York, NY, 10036. These maps were consulted in conference with Prof. Djangaliev and colleagues during their 1992 visit. The proposed collection areas are generalized in Appendix 3.

12. Vehicle and fuel requirements, availability and cost:

As discussed in some of the enclosed correspondence (appendix 1), the majority of the costs will be incurred by the hosts as reciprocation for their two trips to USA. This includes providing 4-wheel drive vehicles. Roads to or near most collection sites are in good repair. However 4-wheel drive vehicles will be needed to obtain access to remote mountainous areas. As discussed in the CAC minutes (appendix 4), they will also provide a helicopter as an option for very remote areas. In negotiations, they suggested that we contribute 50% of the cost of fuel for ground transportation. Fuel is very available in their oil-rich country.

13. Currency/exchange rates:

As of March, 1993 - 600 Ruble/U.S. Dollar

14. Holidays:

No holidays in September - source: Representation of Kazakhstan, The Russian Mission, The United Nations, 136 East 67th St. New York, NY 10021 Ph: 212/472-5947

15. Supplies and equipment:

To be carried from U.S.:
Cameras, film, pruning shears and belt holders, pocket knives, paper and plastic bags, marking pens, data collection forms, clip boards, seed envelopes, field labels, color slides to use for lectures, dried foods to supplement travelling diet, appropriate medicines, clothing appropriate for the season, comfortable shoes, rain protective clothing and boots, extra eyeglasses (sun glasses), small tape recorder to assist in record keeping, ropes for access to fruit in tall trees, green and yellow quarantine labels. Scientific publications, information concerning the NPGS *Malus* collections and apple reasearch in the U.S. will be exchanged with collaborators.

To be obtained in the host country:
Supplies for preparation of herbarium specimens as were provided by the hosts in the 1989 expedition.

16. Field Plan:

The itinerary as discussed in item 22 elaborates on the small map enclosed as Appendix 3. The specifics discussed there are open for amendment by our hosts who are very familiar with the ecology of the area. The capital city of Kazakhstan, Alma-Ata, will be the base site from which expeditions will originate, in particular, the office of Prof. Djangaliev in the Main Botanical Garden of the Academy of Sciences Republic of Kazakhstan. All members of the team will accompany the hosts to effectively collect fruit samples over a local area. Seeds will be extracted as soon as possible including evening hours to lighten loads. Records will be made on site with the assistance of tape recorders. Depending upon the recommendation of the hosts, the expedition will be accomplished in 3 phases. Exploration in Areas 1 and 2 may be accomplished over a 3 day period with overnights at a base camp. This will likely be followed by the trip into Kyrgyzstan (duration dependent upon the hosts). Visas for Kyrgyzstan will be available so that this phase of the program can be facilitated. Following exploration in area 3, there will be need to return to the institute to prepare voucher specimens, process seed collections and verify notes. Travel to the general areas will be accomplished with motor vehicles. Access to remote areas from base camps will be accomplished by helicopter. Nearby sites will be sampled from secondary roads by 4-wheel drive followed by foot access. Planning for food and supplies for these expeditions will be done in the first 2 days at the institute along with other orientation of goals and objectives. Midway through the program, the second phase of the collection will travel to sites Northeast of Alma-Ata. Since the 3 sites listed are separated by distance and mountain ranges, it will be necessary to spend 2 or 3 days in each site travelling to each site by motor vehicle and accessing sites by helicopter.

To complete the program, upon return to Alma-Ata, samples will be processed, notes organized and material packed for hand carry or shipment back to USA. Discussions on future explorations into the Chinese centers of interest will complete the stay.

17. APHIS requirements for import of germplasm:

Dr. George White's Plant Introduction Office (PIO) will be contacted regarding the expectations of collection trip. A permit for apple has already been provided. Green and yellow tags with permit #60500 will accompany all hand carried material and shipped material. All passport information about each accession will accompany the plant materials. APHIS officers at JFK airport in NY City will forward plant material to The USDA Plant Germplasm Quarantine Center (PGQC) in Beltsville (all shipments will use that address). Vegetative material collected and shipped will be kept to a minimum and will be packaged separately from extracted seeds. Seeds may accompany the curator directly to the NGR in Geneva but may be sent with prohibited vegetative material to PGQC depending on the APHIS officers on site. The PGQC will ship seeds to the NGR for maintenance and vegetative material will be maintained at PGQC until released to NGR.

Similarly, green and yellow quarantine tags with permit #60744 will accompany any grape material that will be collected. This will be shipped by APHIS to the address on the grape Permit (Dr. D. Gonsalves, Cornell University, Geneva, NY, who processes any grape introductions coming into USA.

Arrangements will be made with the PIO to be prepared to collect other fruit species.

18. How collections will be shipped to U.S.:

As indicated above, collections will be hand carried or shipped depending on room and timing of seed and scion processing in Kazakhstan. The protocols outlined above will be followed with the proper permits and documentation.

19. Disposition of germplasm after arrival in U.S.

Since the curator of the NGR for Apple and Grape will accompany the expedition team, arrangement has been made for him to receive the materials and maintain at the NGR in Geneva. Clonal material will be maintained at the PGQC until released to the NGR. Personnel at the NGR will coordinate with PIO the documentation of the passport information into the Germplasm Resources Information Network (GRIN). Germplasm will be equally shared with hosts. Germplasm brought to the U.S. will be entered into the NPGS where it will be freely available to all bona fide users, domestic and foreign. Duplicate herbarium specimens will be deposited at the U.S. National Arboretum.

20. Cooperators:

Professor Aimak Djangaliev, Professor of Biological Sciences, Head of the Interbranch Laboratory for the Protection of Germplasm. Academy of Sciences Republic of Kazakhstan, Main Botanical Garden, 187 Tulebaev St. apt. 11, Alma-Ata 480064, Tel 7-3272-620719, Fax 7-3272-620719.

Dr. Alexander Smuryghin, General Director of Research and Production Association, Kazakh Research Institute of Fruit Growing and Viticulture of the Academy of Sciences Republic of Kazakhstan, 238 A. Gagarin Ave., Alma-Ata, 480032, Tel 7-3272-48-20-33.

Ms. Jule Athmetova (Russian/English interpreter currently working with Prof. Dr. Djangaliev). She is the English-Speaking contact by telephone to detail the arrangements for this expedition. Home Tel, 7-3272-41-24-88.

Each of the above cooperators as indicated in the CAC minutes (Appendix 4) visited Geneva, NY in 1992 to lay the groundwork for the described expedition. As discussed in Appendix 1 and 2, Prof. Djangaliev is the lead contact for mutual exchange of germplasm and scientific expertise. His colleague, Dr. Smuryghin will assist in host arrangements for the expedition. Ms. Athmetova did not visit Geneva but is our current contact replacing Ms. Kokhlova who came to U.S. in 1992. Ms. Athmetova or someone chosen by Prof. Djanglaiev will be our interpretor for the expedition period.

21. References consulted:

Rehder, A. 1949. Bibliography of cultivated trees and shrubs.

Chalice, J.S. and A.H. Williams. 1970. A comparative biochemical study of phenolase specificity in *Malus, Pyrus* and other plants. Phytochemistry 9:1261-1269.

Korban, S.S. and R.M. Skirvin. 1984. Nomenclature of the cultivated apple. HortScience 19:177-180.

22. Itinerary:

The map enclosed as appendix 3 indicates the general areas that will be covered. Items 1A-4A are areas where collections were made in 1989: 1A) Near Dushanbe, Tajikistan (Gashni ridge at 39°N lat, 69°E long), 2A) Northeast of Tashkent, Uzbekistan in the Chatkalskiy ridge (Mt. Chimgan at 44°N lat, 71°E long), 3A) East of Tashkent, Uzbekistan near Chirchik (41°N lat, 70°E long) and 4A) South of Alma-Ata, Kazakhstan in the Zailiyskiy Alatau on a ridge north of the lake, Ozero issyk-kul (43°N lat, 77°E long).

The defined itinerary as planned with Prof. Djangaliev includes items 1-6 on the enclosed map. After arrival in Alma-Ata (expedition headquarters) and after finalized planning which will be open to amending by the hosts, the expedition team will drive by motor vehicle, 350 km southwest of Alma-Ata to: 1) Karatau ridge near Dzambul (43°N lat, 71°E long), 2) Tasutkolskoje ridge near Stepnoye (200km SW of Alma-Ata, 43°N lat, 74°E long), 3) Isolated ridge of the Tian Shan mountain range near Dzalal-Abad, Kyrgystan (300 km. south of Alma-Ata, 41°N lat, 73°E long) followed by return to Alma-Ata for 2 days of organization.

The expedition will continue by motor vehicle to: 4) Ketmen ridge near Chorgos (300 km East of Alma-Ata, 44°N lat, 80°E long), 5) Dzungarskij Alatau covering a ridge from Sarkand to Toktv along the Chinese border (400 km NE of Alma-Ata, 45°N lat, 80-82°E long) and finally 6) Tarbagatai ridge near Bachty (500 km from Alma-Ata on the Chinese border at 47°N lat, 83°E long).

After return to Alma-Ata, specimens and notes will be prepared for shipment. Many of the details of the itinerary are discussed in section 16 in terms of time, etc. Collection will be made at different altitudes and topography at each of the general sites so as to sample as much diversity as possible. We would expect the more southern latitudes to be best to explore early in the program (September 8-14) as fruit and seed maturity tend to follow the degree of latitude. The areas north of Alma-Ata would best be explored in the last week (September 16-24). Departure from Alma-Ata to U.S. will be possible on Monday September 27.

23. Budget estimate:

Transportation: Round trip airfare information provided 3/3/93 by AAA Syracuse, NY

E. Dickson:	
Calgary, AL to NY City to Moscow to Alma-Ata ---	$1836
G. Mink:	
Pasco, WA to NY City to Moscow to Alma-Ata -----	$1412
P. Forsline:	
Syracuse, NY to NY City to Moscow to Alma-Ata --	$1262
Misc. ground transportation ($100/person) -------	$300
Per diem:	
6 days x 3 x $125 ----------	$2250
$125 is an estimate based on costs for meals and housing enroute (Moscow or St. Petersburg). It is expected that per diem costs in Kazakhstan will be covered since our hosts are reciprocating for two trips to U.S. (1992 and 1993).	
Other costs in country:	
Fuel for Ground Transportation (50% of cost for 3000 km --$.30/km/2 ----------	$450
Interpreter (provided by hosts) ----------	
Driver (provided by hosts) ----------	
Supplies for herbarium and shipping ----------	$500
Costs in U.S. in preparation:	
Supplies (labels, pens, etc.) ----------	$100
Small tape recorder x 2 and tapes ----------	$150
Field books, pruning shears, misc. equip.) ------	$150
First aid and survival kit ----------	$100
Total trip ----------	$8510

Reciprocation trip (3 Kazakh scientists & interpreter)
Oct. 1-Oct 20, 1993 to Davis and Fresno, CA,
Corvallis, OR and Prosser and Yakima, WA

Air fare for 4 (within U.S., Sacramento to Corvallis to Pasco to San Francisco) ------	$2100
Ground Transportation ----------	$900
Per diem $75 x 20 x 4 ----------	$6000
Total reciprocal trip ----------	$9000

Additional costs supplied by hosts in U.S. sites:
(Ground transportation and misc. expenses similar to the experience of PGRU in Geneva in 1992).
Kazakhs fund their transportation probably directly to San Francisco (not New York City or Washington D.C.) since this will be a west coast experience only.

Total budget with reciprocal trip ----------	$17510

24. Vitae:

Attached

December 24, 1992

Prof. Aimak Dj. Djangaliev
Academy of Sciences
Main Botanical Garden
187 Tulebaev st. Apt. 11
Alma-Ata 480064
Republic of Kazakhstan

Dear Professor Djangaliev:

Thank you for informing us of your proposed plans for the late summer of 1993. Again, let us acknowledge that we enjoyed your visit and look forward to seeing you again. As we discussed, three U.S. scientists (Philip Forsline and two other fruit specialists) were planning to be in Kazakhstan from August 20 - September 10. However, we can revise the dates as you recommend (perhaps leaving New York September 6 and returning to New York around September 24).

We also had initiated planning for a reciprocal visit for your team to visit Washington, Oregon and California from September 20 to October 10. Perhaps the visit can be accomplished from October 1 - October 20 . We will assist you by coordinating and arranging your itinerary with appropriate U.S. National Plant Germplasm System personnel as well as with Calvin Sperling. In summary, we will plan to accommodate your needs. We do not wish to create a conflict with your planned participation in the International Botanical Congress.

We are happy to see that you now have fax capabilities! Best wishes for a successful 1993.

Sincerely,

STEPHEN KRESOVICH, Ph.D.
SUPERVISORY GENETICIST AND RESEARCH LEADER

PHILIP . FORSLINE
HORTICULTURIST/CURATOR

cc:
C. Sperling

Academy of Sciences
Republic of Kazakhstan

Main Botanical
Garden

Alma-Ata 480064
187 Tulebaev st.
apt.11
Phone: 62-07-19
Fax: 73272620719

December 23, 1992

Stephen Kresovich
Supervisory Geneticist and Research Leader
Plant Genetic Resources Unit
New York State Agricultural
Experiment Station
Cornell University
Geneva, New York 14456-0462
Fax: (315) 787-2397

Dear Stephen Kresovich,

I was very glad to meet with you, your colleagues and especially with Philip Forsline. Many thanks for the invitation to take part in the conference on Malus and the opportunities to get acquainted with your scientific programs and to work in cooperation with you. Our agreement signed on the 19th of October 1992 has got the support here and the American Embassy in the Republic of Kazakhstan has been informed about this fact. We began to make preparations for the field expedition. As I'll take part in the XV International Botanical Congress from August 28 to September 3, 1993, it is necessary to correct the date of the start of our expedition. It is desirable to change for September 8-10. And we are to change the date of our visit USA. If all these changes break your plans I'll refuse to go to Japan in order to be faithful to our agreement. I'd like to know your opinion on the question.

Many thanks to you for the help, I've got Catalogues from Corvallis and Davis.

My best regards to your colleagues.

Merry Christmas!

Sincerely yours
A. Djangaliev

United States Department of Agriculture
Agricultural Research Service
North Atlantic Area
Plant Genetic Resources Unit
Cornell University
Geneva, New York 14456-0462

18 September 1992

Professor Aimak D. Djangaliyev
Corresponding Member, Academy of Sciences
Main Botanical Garden of the Kazakh Academy of Sciences
Timiryazeva Street
480070 Alma Ata
Kazakhstan

Dear Professor Djangaliyev:

We would like to invite you, Dr. Alexander Smuridin and Assistant Professor Khokhlova to attend the annual meeting of the Apple Crop Advisory Committee at Geneva, New York, October 15-17, 1992, and to visit the Geneva Campus of Cornell University during the period October 12 - 18, 1992.

We understand that you have funding to travel from Alma Ata to New York City and return. We will cover the expenses of your travel between New York City and Geneva (Geneva is about 500 km from New York City), and of your accommodation and meals at Geneva. The hotel is reserved for that period.

We suggest that you make airline reservations to arrive at Kennedy Airport, New York City on October 12 or as close to that date as possible. Fax (315-787-2397) or telephone (315-787-2390) to Mr. Forsline immediately the date and time of your arrival and your airline and flight number. When we know this information, we will make arrangements for your travel to Geneva, probably by a continuing flight on a domestic airline.

With best regards.

Sincerely,

Philip L. Forsline
Curator
National Germplasm Repository
for Apple and Grape

Herb S. Aldwinckle
Professor and Chairman
Dept. of Plant Pathology
Cornell University, Geneva
Vice-Chairman, Apple CAC

Safi S. Korban
Assoc. Prof of Horticulture
Univ. of Il.
Chairman of Apple CAC

Telephone: 315-787-2244
Fax: 315-787-2397

Schedule For Visit of Guests from Kazakhstan

Professors: Djangaliyev, Smuridin and Khokhlova

October 9 - Arrive in NY City

October 11 - Arrive in Rochester

October 12
- 8:30a - Orientation to Cornell at Geneva
- 9:30a - Orientation to PGRU (P.Forsline and S. Kresovich)
- 12:00 - Lunch
- 1:30 - Orientation to NGR *Malus* collection
- 3:30p - Apple Breeding Program (S. Brown)
- 6:30p - Dinner (H. Aldwinckle, Chairman of Plant Pathology, and P. Forsline)

October 13
- 8:00a - Genetic studies in *Malus* (N. Weeden)
- 9:30a - Horticultural Sciences Chairman (H. Price)
- 10:00a - Hort Sci. Departmental Coffee Break
- 10:30a - Apple Rootstock Breeding (J. Cummins)
- 12:00n - Lunch
- 1:15p - Apple Tree Architecture (T. Robinson)
- 2:30p - Short visit with Dr. J. Hunter, Director of NYSAES
- 3:00p - Laboratory of H. Aldwinckle
- 4:00p - Small fruits Breeding Program (K. Maloney)
- 5:00p - Local retail and wholesale fruit market (J. Nicholson of Red Jacket Fruit Farms)
- 5:45p - Geneva Apple Breeding history (R. Way, Prof. Emeritus) ---travel to Darrow Farm collection if weather suitable
- 7:00p - Dinner

October 14
- 8:00a - Leave for Cornell (Ithaca) with H. Aldwinckle accompanied by F. Browning of NPR
- 9:30a - Assoc. Director for International Agriculture (L. Zuidema)
- 10:15a - Tour of Cornell Campus (H. Aldwinckle)
- 11:00a - Bailey Hortorium (R. Dirig and others) Meet at BH, room 461
- 12:30p - Lunch
- 1:30p - Meet R. Wesley at Bailey Hortorium, travel south of Ithaca to observe some native stands of *Malus coronaria*
- 5:00p - Return to Geneva with P. Forsline and F. Browning
- 6:00p - Evening for relaxation

APPENDIX I

October 15	- 8:00a	- Virus detection and eradication (S. Sheffer, NGR)
	- 9:30a	- Grape Breeding Program (B. Reisch)
	- 11:00a	- Stone Fruit and Pear Breeding (R. Andersen) ---he will also accompany visitors to lunch
	- 1:00p	- Biotech in Apple (meeting in FST)
		- Prof. Smuryghin do self-guided tour of grapes
	- 4:00p	- Possible meeting with local press
	- 5:00p	- Evening session with CAC participants (to be arranged)
October 16	- 8:00a	- Apple CAC
	- 5:00p	- Evening for relaxation
October 17	- 8:00a	- Leave for tour of Apple industry in the Lake Ontario region
	- 9:00a	- Meet S. Hoying in Alton, NY and observe Orchards in the immediate area
	- 10:30a	- Leave for Kirby Orchards in Albion---lunch enroute
	- 12:30p	- Kirby Orchards (Bruce Kirby, 716/589-1922) in Albion
	- 2:00p	- Oaks orchards (Dan Thurber, 716/798-4133) in Lyndonville
	- 2:45p	- Depart for short visit to Niagara Falls or return to Geneva
		- Evening for relaxation
October 18		- a.m. (independent) and/or NGR apple collection
		- p.m. Visit Glenora Winery ---Contact Greg (243-5511) who has us on a general schedule for p.m. with Gene Pierce, call back 10/16 with a specific time
October 19	- 8:00a	- Complete discussion of future exchanges (plant and scientific) with PGRU personnel
	- 11:00a	- Depart for Rochester airport

21-08-92 11:17 AM EMB 165 P01

FAX COVER SHEET

AMERICAN EMBASSY
ALMA ATA, KAZAKHSTAN

TEL: FAX: 7 3272 633883

FAX NO : 315 787 2389 DATE: AUGUST 19, 1992

TO : HERB ALDWINCKLE

ATTENTION:

FROM :

SUBJECT :

DEAR HERB,

THANK YOU VERY MUCH FOR YOUR FAX-LETTER AND INVITATION. I ALSO KINDLY INVITE YOU AND SOME TWO OR THREE SCIENTISTS TO PARTICIPATE IN OUR EXPEDITION IN 1993. WE'LL TAKE UPON OURSELVES ALL THE EXPENSES ON THE TERRITORY OF KAZAKHSTAN AND CENTRAL ASIA. DETAILS ARE IN THE FAX TO PHILIP L. FORSLINE.

SINCERELY YOURS,
DR.DJANGALIYEV.

No. of Pages - Cover Sheet +

Please contact the American Embassy when total pages are not received, or when message is unreadable.

Professor Aimak D. Djangaliev
Main Botanical Garden of Kazakh Ac. Sci.
Timiryazeva Street
480080 Alma Ata
KAZAKHSTAN

Dear Professor Djangeliev:

I received your kind invitation recently to join your expedition for fruit collecting which is ongoing in your program from the present until September 1992. Unfortunately, it is impossible for me or anyone else in USA to join this expedition at this short notice. We are very appreciative of your invitation and offer of financing the trip. Please let us know if you will be conducting a similar expedition in 1993. We would then be very happy to join you. Our Crop Advisory Committee for Apples meets this year in Geneva, New York on October 15 and 16, 1992. We offer an invitation for you to join us at that time if you can. It is at these meetings that we plan such expeditions in addition to other matters of business. Let us know of your interest in travelling briefly to USA. If you are interested, we will determine if we can find some funding for your travel.

If you cannot attend our Committee meeting, please send details of a possible similar expedition in Kazakhstan and neighboring countries in 1993. Then we can respond with a more positive note after the Committee has had a chance to deliberate.

I was pleased to receive word that your scions arrived. Dr. Sperling is in Turkey presently. Ms. E. Dickson is continuing her studies at Cornell University. We look forward to hearing from you.

Sincerely,

Copy

PHILIP L. FORSLINE
Horticulturist/Curator
National Germplasm Repository
for Apple and Grape

cc:
Laura Henry, EUR/ISCA
Agricultural Counselor
FAS
ARS/IA
AD, NAA
USDA:ARS:NAA:PForsline:PLF:6/29/92
315/787-2390

June 23, 1992

Philip L. Forsline
Horticulturist/Curator
National Germplasm Repository for Apple and Grape
Agricultural Research Service
Plant Genetic Resources Service
Cornell University
Geneva, New York

Dear Mr. Forsline:

I would like to thank you for the scions of apple accessions and invite you and Calvin to take part in our expedition (which has already started and which will continue till September) to the mountains of Kazakhstan, Uzbekistan and south Kirgizia in search of fruit and nut-bearing plants.

The Academy will pay all expenditures on the territory of Kazakhstan and the other republics of the CIS. Please indicate the time and duration of your visit. The situation is stable here. I have not heard from Calvin Sperling so far. Please contact him and send him my invitation to visit Alma Ata along with his wife.

Sincerely,
Dr. Aimak D. Djangaliev,
Corresponding Member
Academy of Sciences

JOINT INITIATIVE FOR COOPERATIVE RESEARCH

between the

INTERBRANCH LABORATORY FOR THE PROTECTION OF GERMPLASM (REPOSITORY AND INTRODUCTION)
Alma-Ata
ACADEMY OF SCIENCES
MAIN BOTANICAL GARDEN
Republic of Kazakhstan

and

PLANT GENETIC RESOURCES UNIT
AGRICULTURAL RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE
Geneva, New York
United States of America (USA)

SERVING CONSERVATION AND AGRICULTURE THROUGH EFFECTIVE MANAGEMENT OF PLANT GENETIC RESOURCES

19 October 1992

Scope:

From the perspectives of conservation biologists, gene bank curators, and plant breeders concerned with the preservation and utilization of genetic resources of economically important crop taxa, genetic diversity below the species level is of critical interest. This perspective, with its emphasis on variation at the population or even individual level, is often accorded a minor role by conservationists, who tend to concentrate at the level of the botanical species. Quoting from an Office of Technology Assessment report (1987):

"Biological diversity refers to the variety and variability among living organisms and the ecological complexes in which they occur. Therefore, included within the framework of biological diversity is ecosystem, species, and genetic variation. Concerns over the loss of biological diversity to date have been defined almost exclusively in terms of species extinction. Although extinction is perhaps the most dramatic aspect of the problem, it is by no means the whole problem. The consequence is a distorted definition of the problem, which fails to account for many of the concerns and may misdirect how concerns should be addressed."

Thus, some efforts to conserve genetic resources of economically important taxa may focus on goals which are ephemeral and, in effect, represent only artifacts of previous concepts rather than the critical elements of inter- and intraspecific genetic diversity (wild and weedy relatives, landraces, and elite material). Of equal importance, the limited resources directed toward both *in situ* and *ex situ* conservation must be expended effectively, in a prioritized, cost-efficient manner. Our planned cooperative endeavors will consider the extent of this distortion and help redirect the focus of concern.

The center of origin of *Malus X domestica* Borkh. (cultivated apple), a perennial temperate taxon, is hypothesized to be located at the border between the Republic of Kazakhstan and the People's Republic of China. Because of human intervention through domestication, exchange, and crop improvement, the center of diversity now is documented to be Republic of Kazakhstan, the provinces of Yunnan and Sichuan, People's Republic of China, and the National Repository for Apple and Grape in Geneva, New York. Closer coordination for (1) development of priorities, (2) integration and back-up of genetic resources, and (3) cooperation between relevant researchers and curators, is essential for most effective long-term conservation and use of *Malus* spp.

In August/September of 1989 and 1990, a team of US scientists visited Republic of Kazakhstan and adjacent Soviet republics to collect native genetic resources of *Malus* spp. and establish contacts with interested scientists of the region. In October of 1992, a team of Kazakhstan scientists conducted a follow-up visit to Geneva, New York to review activities at the National Repository for Apple and Grape and attend the U.S. National Plant Germplasm Systems's Apple Crop Advisory Committee meeting. In addition, during this period the National Repository for Apple and Grape has already distributed approximately 500 accessions to the republic of Kazakhstan.

A next, logical step in the effort is to establish more direct, bilateral cooperation among organizations and scientists. This proposed bilateral initiative, to include both planning and subsequent coordinated research, will serve as a model to address critical human dominated systems and temperate ecosystems conservation and agricultural needs for the development of an effective continuum from *in situ* inventory, through *ex situ* preservation and use of plant genetic resources of an economically important taxon, *Malus* spp.

Overall Objectives:

To establish compatible conservation and agricultural strategies, techniques, and analyses for:

* inventory, collection, and exchange of the *in situ* and *ex situ* genetic diversity of *Malus* spp. in the Republic of Khazakstan, and USA,

* *in situ* and *ex situ* conservation of *Malus* spp., and

* agricultural use of the genetic resources of *Malus* spp.

Actions:

* Development and compilation of compatible databases for genetic resources collections of *Malus* spp. and related genera,

* Reciprocal exchanges of genetic resources for research programs of mutual interest to both laboratories,

* Joint plant expeditions and ecogeographic studies on native genetic resources of *Malus* spp. and related genera of both countries, and

* Exchange of scientists for research on plant genetic resources and associated disciplines.

Scientific Disciplines To Be Represented:

Botany (Taxonomy/Systematics)

Plant Genetic Resources Conservation, Biometry, and Use

Pomology, Ampelography, and Introduction

APPENDIX 1

It is clearly understood that (1) the proposed activities will be conducted within the existing laws and regulations of each cooperator; (2) detailed arrangements on budget and funding for specific activities will be discussed and agreed upon by direct negotiations among scientists of the Interbranch Laboratory and the Plant Genetic Resources Unit; and (3) under this Agreement there is no intent to undertake work that would generate intellectual property rights. Nevertheless, in the event that developments inadvertently occur that are subject to protection as intellectual property, special agreements will be negotiated on a case-by-case basis.

Signed,

DR. AIMAK DJ. DJANGALIEV
HEAD

DR. ALEXANDER S. SMURYGHIN

INTERBRANCH LABORATORY FOR THE PROTECTION OF GERMPLASM
(REPOSITORY AND INTRODUCTION)
Alma-Ata
ACADEMY OF SCIENCES
MAIN BOTANICAL GARDEN
Republic of Kazakhstan

STEPHEN KRESOVICH
SUPERVISORY GENETICIST AND RESEARCH LEADER

PLANT GENETIC RESOURCES UNIT
AGRICULTURAL RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE
Geneva, New York
United States of America (USA)

19 October 1992

APP 3

APPENDIX 1

United States Department of Agriculture | Agricultural Research Service | North Atlantic Area | Plant Genetic Resources Unit
Cornell University
Geneva, New York 14456-0462

February 8, 1993

SUBJECT: Apple Crop Advisory Committee (CAC) meeting 1992

TO: Apple CAC Members and Other Attendees As Listed

FROM: Philip L. Forsline, Curator, NGR for Apple and Grape

MINUTES OF THE 1992 MEETING

The Apple CAC meeting convened at 8:30 a.m. on October 16, 1992 at the New York State Agricultural Experiment Station (NYSAES), Geneva, NY.

Attached is the CAC membership list as approved at this meeting (Appendix I). Those CAC members attending were: H.S. Aldwinckle (vice-chairman), R.C. Lamb, R.D. Way, N.F. Weeden, C.A. Huckins, J.C. Goffreda, M. Faust, J.N. Cummins and G.I. Mink. Ex officio members attending were: P.L. Forsline and S. Kresovich. Adjunct member attending was: Y. Lespinasse. Guests attending were: T.L. Robinson, H.C. Price, R.L. Anderson, M. Cagley, M. Bohning, B. Morris (New Zealand), John Warner and Margie Luffman (Canada), A.D. Djangaliev, A.S. Smuryghin and G. Khokhlova (Kazakhstan).

This summary follows the outline of the attached agenda (Appendix II).

I. The nominating committee appointed by the vice chairman, H. Aldwinckle (presiding at this meeting) consisted of: J.N. Cummins and J. Goffreda.

II. A. Status of CACs is presented in Appendix III.

B. M. Bohning presented an update of National CAC activities. The CAC chairs held the biennial meeting in Beltsville, MD on June 16 and 17, 1992. Appendix III includes a summary of the items that M. Bohning discussed.

A recent report of activities in GRIN is enclosed as Appendix IV. Public users may now access GRIN through a software package (PC GRIN) where files of an entire crop database can be accessed through a floppy disc. However, direct link will always be available.

Telephone: 315-787-2244 Fax 315-787-2397

Appendix V was distributed which discusses some of the policies on clonal germplasm.

C. S. Kresovich presented a discussion on the direction of some of his research in the Plant Genetic Resources Unit (PGRU) at Geneva. His work is concentrating on methods of assessing genetic diversity in Malus and Brassica. He is proposing to purchase an automated DNA analysis system which is quite costly but the lab may become a service to The National Plant Germplasm System. In addition the equipment could be shared with cooperative projects within our CAC community. The questions to answer with this technology would be: identity, structure, diversity and mapping.

The committee supports this concept fully after general discussion.

III. A. The 1991 minutes were approved by motion of N.F. Weeden and seconded by R.C. Lamb.

B. The Subcommittee on Biotechnology met on October 15. The agenda for that meeting is attached as appendix VI. Twenty five people attended the meeting which consisted of oral presentations by researchers listed in appendix VI.

C. The Core collection project is proceeding on schedule. Appendix VII lists the 200 genotypes that were budded in August 1992 by the Fruit Testing Association at the Geneva Experiment Station. Trees (4 Reps of each to 5 sites) will be ready for shipment in Spring 1994. The sites are NY, MN, NC, WA and IL. Money left in the grant should pay for the propagation and posts. State evaluation leaders should submit proposals for subsequent maintenance and evaluation of these blocks. This can be part of the call for evaluation proposals in 1993.

Appendix VIII is a short summary by C.R. Rom of the project funded in 1992 .

The rating of new evaluations went out in a letter from S. Korban (appendix IX). Two other proposals were submitted but were not prioritized. The proposal by Lakso and Flore, 'Responses to Increasing Atmospheric Carbon dioxide' was rated highly by the committee but Lakso was encouraged to resubmit another year. G. Mink informed the committee in December 1992 that his proposal to test the collection for hypersensitivity to ASGV was funded. Most of the germplasm listed in the core collection (appendix VII) is being sent to him for evaluation. The National program leader funds usually only one proposal (at most) per CAC and informed the chairman that the G. Mink proposal was the highest priority for evaluation since the NGR and NSSL already have a.Pilot Program on Cryopreservation in Malus. There was some confusion re the Proposal Rating Sheet (PRS) that

is sent out to the CAC members to prioritize for evaluation proposals. Therefore, a draft of an improved PRS is enclosed as appendix X. CAC member's comments are invited. Please return your comments on this draft as soon as possible.

Finally re data included in published reports on apple, the repository personnel, in consultation with research specialists in the appropriate areas, will compile these results from the literature and load to GRIN using approved descriptors. We also need to encourage researchers to publish from now on using uniform GRIN codes.

D. The status of the Malus germplasm collection was reported by P.L. Forsline and is attached as appendix XI.

E. Report on GAO survey was tabled with the absence of S. Brown.

F. Appendix XII is a report by S. Hurtt discussing the apple quarantine activities at the National Germplasm Resources Lab quarantine facility in Beltsville/Glenn Dale. M. Bohning supplemented this report stating that personnel vacancies have been a problem in the past but these have now been filled. Michael Cagley, from the former Florida Citrus Repository, has been hired as the greenhouse/orchard manager. Mike was present at this meeting to be introduced and describe some of his duties. The APHIS master plan is progressing and should be completed by 1998.

G. A list of additional descriptors (Appendix XIII) to supplement those discussed in the 1991 CAC minutes was distributed for committee comment. After editing, these will also be entered into the GRIN record. Some members of the CAC are determining which insect descriptors need to be added.

A sample of data loaded for a specific apple accession is provided in Appendix XIV.

H. Dr. Bret Morris provided a summary sheet (Appendix XV) that lists those involved in apple research in New Zealand.

Dr Yves Lespinase discussed some of the latest information from Europe. There is evidence that the Vf scab resistance in some varieties is susceptible to a population of the pathogen Venturia inaequalis in northwestern Europe. A European network of scientists from France, Germany, Switzerland and Netherlands is studying this problem.

Unified Germany has reorganized its germplasm collection under Dr. Manfred Fischer in Dresden-Pilnitz. Dr. Christa Fischer will be the principal apple breeder for all Germany in Dresden-Pilnitz in future.

IV. A. Professor Aimak Djangaliev Presented a discussion and slide display of plant diversity in Kazakhstan. Professor Djangaliev is the Head of the Interbranch Laboratory for The Protection of Germplasm, Academy of Sciences Main Botanical Garden, Alma-Ata, Republic of Kazakhstan. He was accompanied by Dr. Alexander S. Smuryghin, General Director of Research and production of the same institute, and Assistant Professor of Linguistics, Galina Khoklova of Alma-Ata University (interpreter). Professor Djangaliev discussed the presence of 3 species of Malus in the region of Alma-Ata. M. sieversii is the source of our domesticated apple. This area also contains almond, apricot, pistachio and other fruit species totalling 129. The region includes a range from 400 km south of Alma-Ata (Karatau mts.) to 450 km north of Alma-Ata (Djungarskij Mts.) and east into Kyrgyzstan. The Altai area further north is populated by M. baccata. They have developed a protocol of intentions for cooperation with Chinese scientists, particularly those in the Tien Shan mountain region bordering Kazakhstan. They will have a joint Kazakh/China expedition in the near future.

Discussion of future expeditions into Kazakhstan was held. Professor Djangaliev came here to establish firm contacts with U.S. Scientists and is offering to host a group of American scientists in Kazakhstan in late summer 1993. P. Forsline and S. Kresovich worked up a joint initiative for cooperative research between the PGRU in Geneva and Professor Djangaliev's institute. Some of the details of the collection trip were discussed following the meeting using a detailed map of Kazakhstan. The expedition will include much of the range described in the above paragraph. Helicopters will be available to transport the expedition team into remote areas. The personnel participating in the expedition and detailed plans will be developed with the assistance of the Plant Exploration Lab in Beltsville under the direction of Dr. Calvin Sperling. The area covered will be broader than that of the short collection trip to Kazakhstan in 1989. It was suggested that some of the apple stands in this region may have evolved in areas of iron-deficiency. These would be very valuable traits to have in our collection. Professor Djangaliev also suggested that the neighboring republic of Kyrgyzstan is rich in nut species. Perhaps this could be a joint expedition with American researchers having these interests.

Connections with Chinese scientists in South China (Yunnan and Sichuan) have also been made by personnel of the PGRU and others at the NYSAES. Professor Xulan Hu of Yunnan is presently working on sabbatic in Citrus Breeding in Florida and visited the PGRU in June 1992. Through him, we have firmed up some of these Yunnan and Sichuan contacts.

Professor Djangaliev will assist us with contacts in Western China. This area borders on China at the Tien Shan mountain range. The species in that area are similar to those in

Kazakhstan but are important in our plan to collect diversity from all centers of origin. Dr. Kresovich suggested other Chinese contacts that he made during his 1991 trip to China and others as a result of his contacts at the Missouri Botanic Garden. Dr. Faust also suggested some key contacts that he has made.

Appendix XVI was distributed to document the present diversity of the NGR collection. In order to plan new collection trips, we need to know where we have gaps in our collection. We are in good shape with the North American species and with elite materials in the collection. However, we have limited accessions of the Asian and European species.

B. Discussion of the procedure for handling the five-site core collection was held. Earlier discussion in this report was held and the list of materials is in appendix VII. The project is being directed by Dr. Korban. Each site must make plans now as to how they are going to handle their individual plantings after trees are distributed in Spring 1994. The research proposal presently covers cost of propagation and purchase of posts for 'Slender Spindle' planting system. New evaluation proposals should be submitted in 1993 to cover costs of early maintenance at the sites. At future meetings of the CAC, the evaluation strategy at these different sites must be discussed. Genotype-by-environment interactions will be studied and coordinated among the sites. We discussed that this project is analogous to the NC-140 regional rootstock evaluation project. Proposals submitted in 1994 and 1995 should be made to cover the costs of these evaluations. It was suggested that each site consider isolated planting sites for the collection and that they start planning immediately as trees will be shipped in spring 1994.

C. Protocols for maintenance of proprietary materials was discussed. There was discussion pro and con as to whether this material should be held. Some felt that it should be held in a true-to-type, virus-free fashion at a site such as the repository where it can easily be accessed. Most patented materials are available in commerce and probably need not be held.

D. Because CAC members representing industry were unable to attend this year, there was no discussion of industry concerns.

E. Appendix XVII was distributed to the CAC for their input. This is a list of 400 accessions that the CAC had previously given input on as being of very low priority. They are held in the temporary orchard and have not been heat-treated. There are 5 columns on the list including GMAL #, name, number of distributions since 1988, reason to reject and reason to save. Each CAC member was asked to provide the curator input on the

last 2 columns. In some cases, we have already indicated that the accession is a duplicate of another accession in the collection The curator did receive input on this and is compiling the results. It was suggested that the list be published in Fruit Varieties Journal prior to removal. The curator is also working with the NGR research group to obtain analyzed results of isozymes done on this collection. These data may indicate that some of the material has some unique alleles.

V. A. The results of the nominating committee's actions are listed in appendix I concerning members whose terms expire in 1995. S. Brown, G. Mink and R. Lamb, whose terms expired in 1992 were elected to another term. New members elected were H. Reissig and C. Rom. The nominating committee also presented the officers to be: Chairman, H.S. Aldwinckle and Vice-chair, G. Mink. This slate of officers was approved by the committee. Motion was made by J. Cummins and seconded by N. Weeden that we appoint ex-officio members J. Warner (replaces S. Miller) and S. Hurtt (replaces B. Parliman). The motion was carried.

B. The ideal time for the next meeting is October 21 and 22, 1993. Three meeting places were suggested: Prosser, WA, Geneva, NY and Kentville, Nova Scotia. NS was suggested since that is where the next Biennial Apple/Pear Breeders Cooperative is scheduled to be. When the date of that meeting is determined, the chairman and curator will send a ballot for meeting place of the CAC.

C. In the last item of business M. Cagley of the Plant Quarantine Lab offered to collect pollen or make crosses on some of the restricted material still held in quarantine. Breeders can contact him directly with their requests.

APPENDIX 2

Kazakh visitors and USA west coast hosts

Kazakh scientists arrived in San Francisco October 8, 1993 and departed San Francisco October 29, 1993 after visits in:

1) Washington State (Wenatchee, Yakima and Prosser, 10/9/93-10/15/93), Host, Dr, Gaylord Mink, Irrigated Agricultural Research and Extension Center, Washington State University, Prosser, Wa 99350, Tel. 509/(786-2226, FAX 786-3454)

2) Corvallis, OR, (10/15/93-10/20/93), Host, Dr. Kim Hummer, USDA/ARS, National Germplasm Repository, 3347 Peoria Road, Corvallis, OR 97333, Tel. 503/(750-8712, FAX 750-8717)

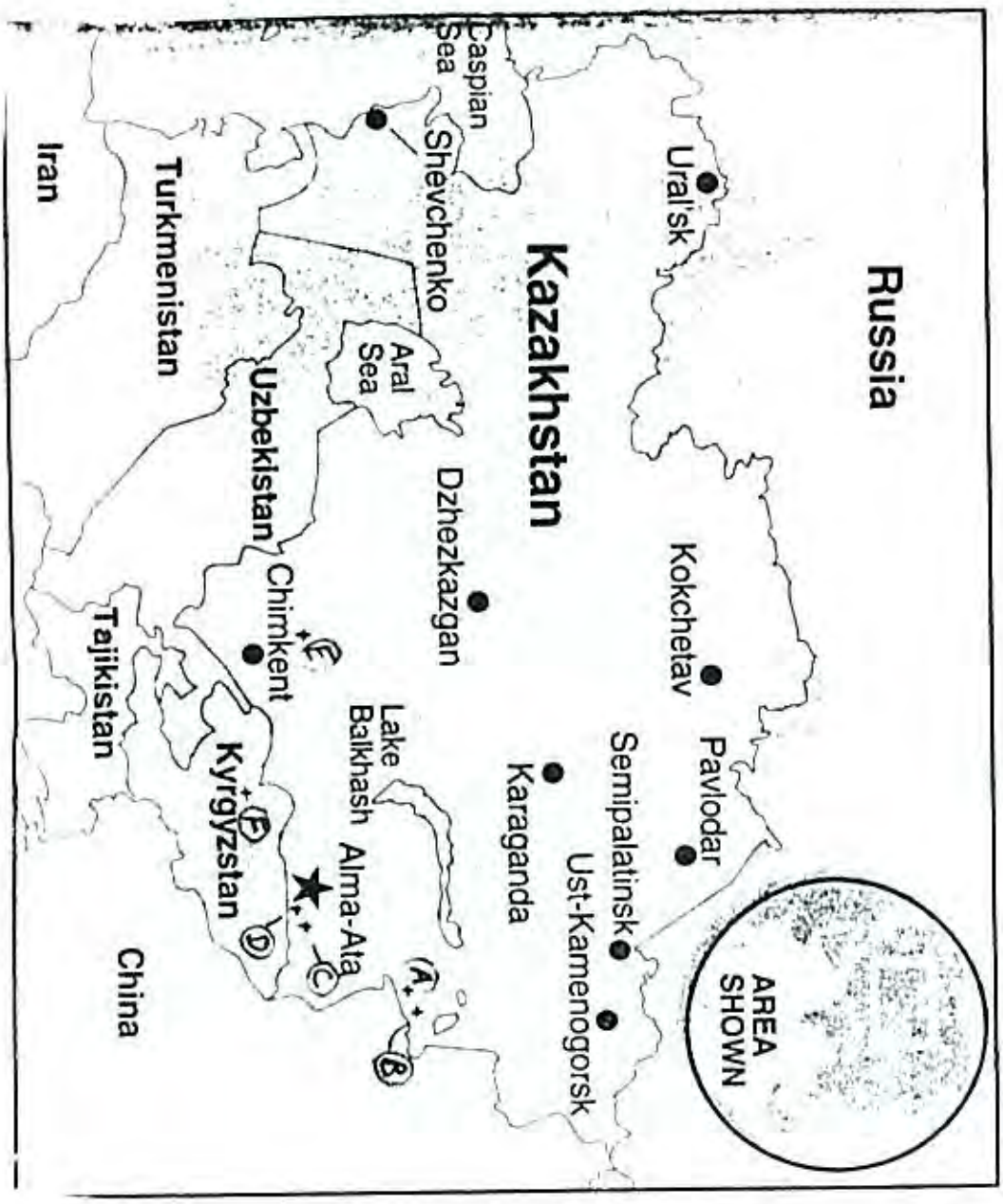
3) Fresno, CA, (10/20/93-10/23/93), Host, Dr. David Ramming, USDA/ARS, Horticultural Field Station, 2021 S. Peach Ave., Fresno, CA 93727, Tel. 209/(453-3500, FAX 453-3011)

4) Davis, CA, (10/23/93-10/29/93), Host, Dr. Katie Rigert, USDA/ARS, National Germplasm Repository, University of California, Davis, CA 95616, Tel. 916/(752-6504, FAX 752-5974)

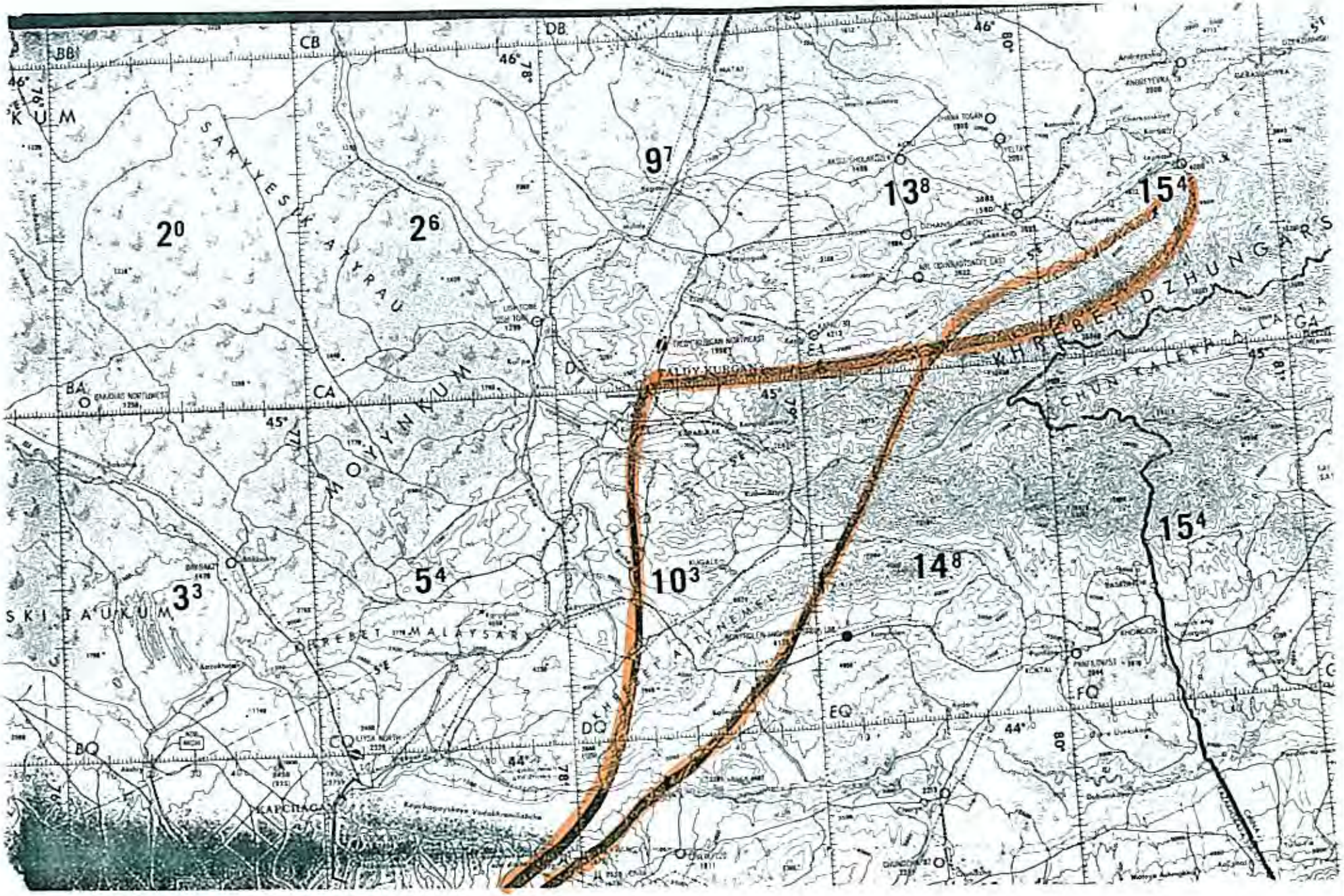
The Kazakh participants were as follows and were major hosts in Kazakhstan as listed earlier:

1) A. Djangaliev
2) A. Smuryghin
3) A. Amanbayev
4) T. Salova (wife of A. Djangaliev and expert on Stone Fruits)
5) S. Dusembina (interpreter)--Saule

APPENDIX 3

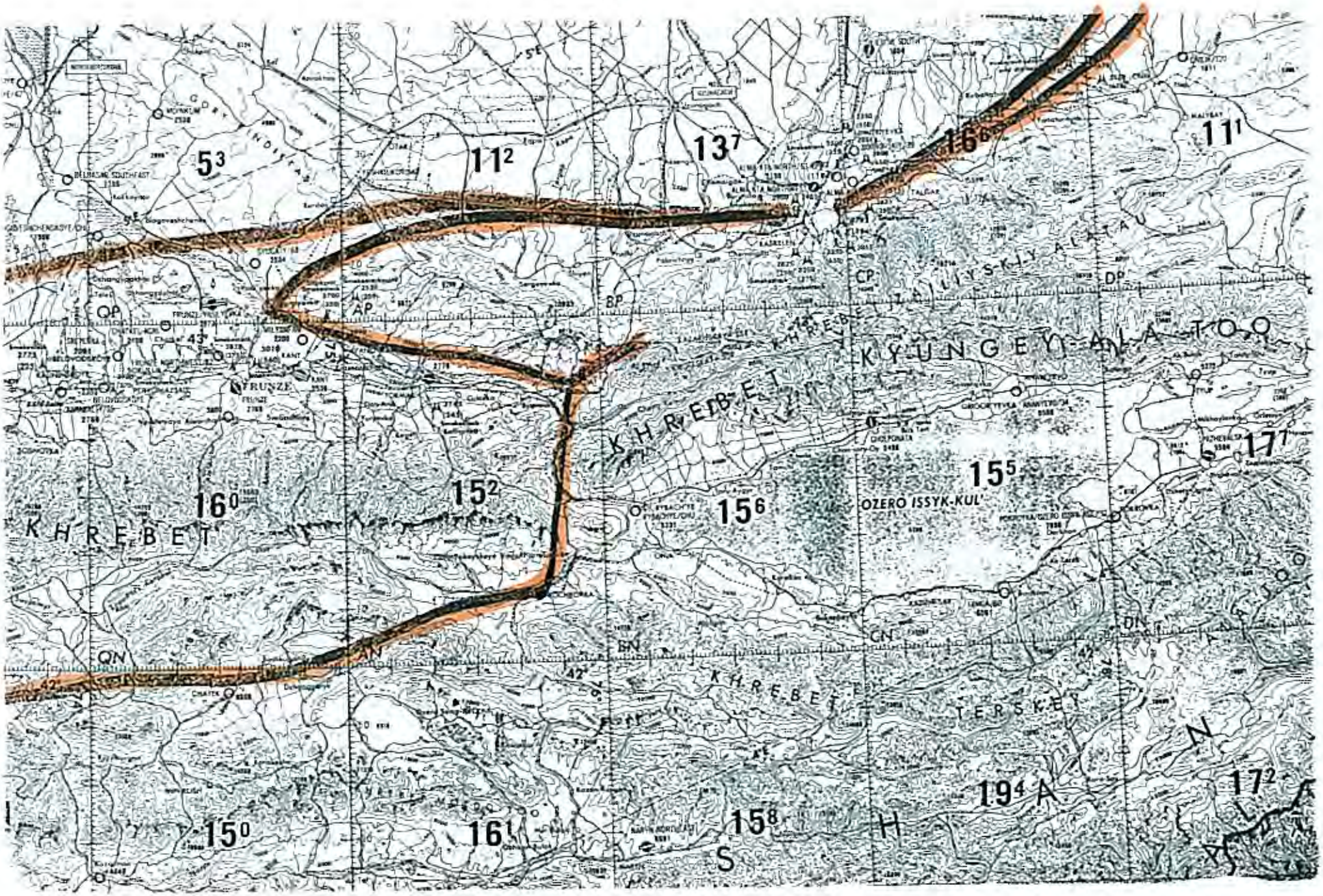

AREA SHOWN
Russia
Ural'sk
Kokchetav
Pavlodar
Semipalatinsk
Ust-Kamenogorsk
Karaganda
Kazakhstan
Caspian Sea
Shevchenko
Aral Sea
Dzhezkazgan
Lake Balkhash
Alma-Ata
Uzbekistan
Chimkent
Kyrgyzstan
Tajikistan
Turkmenistan
Iran
China
A
B
C
D
E
F

APPENDIX 4
ROUTE 1

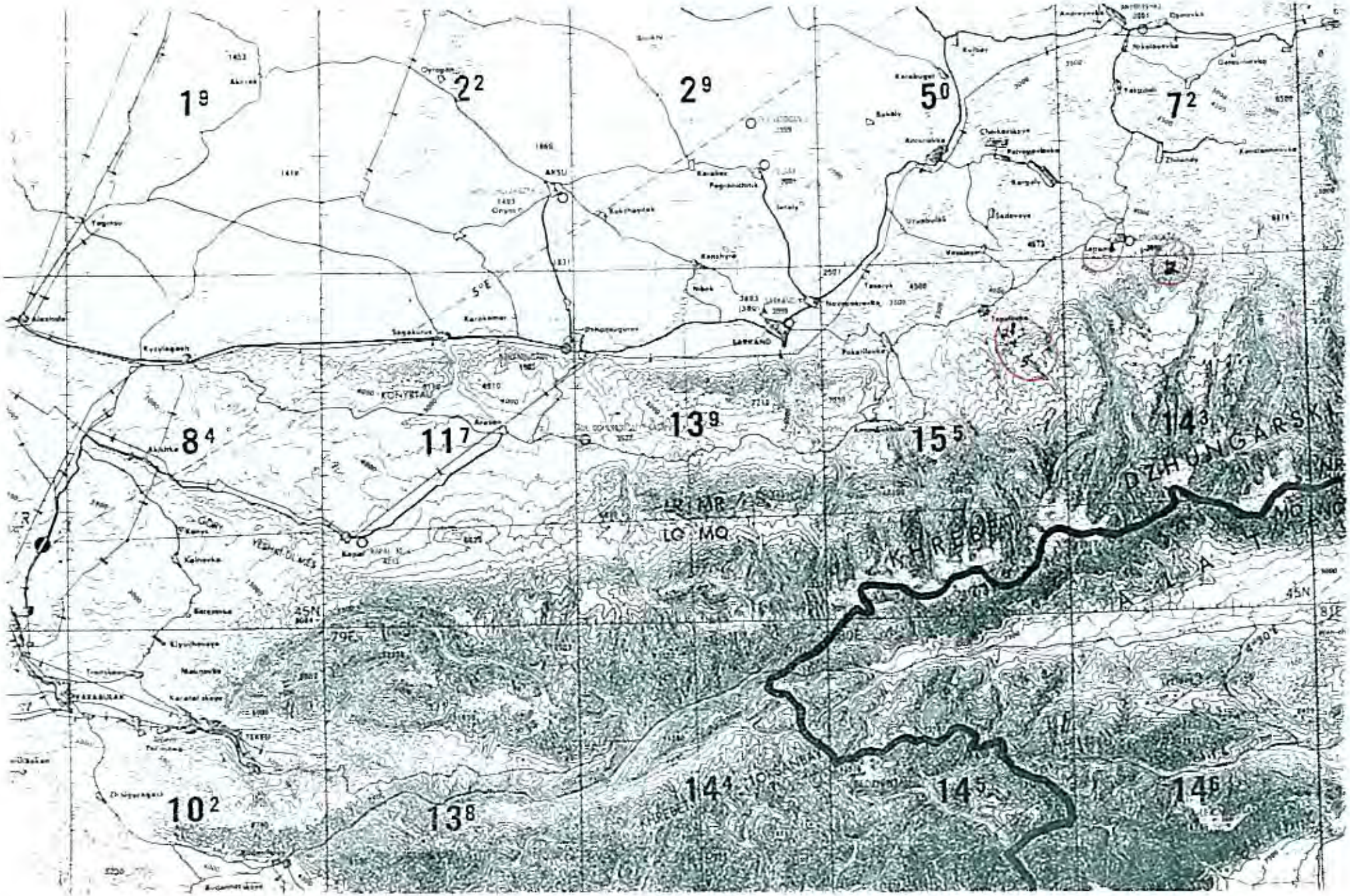


APPENDIX 4
ROUTE 2

APPENDIX 4
ROUTE 3

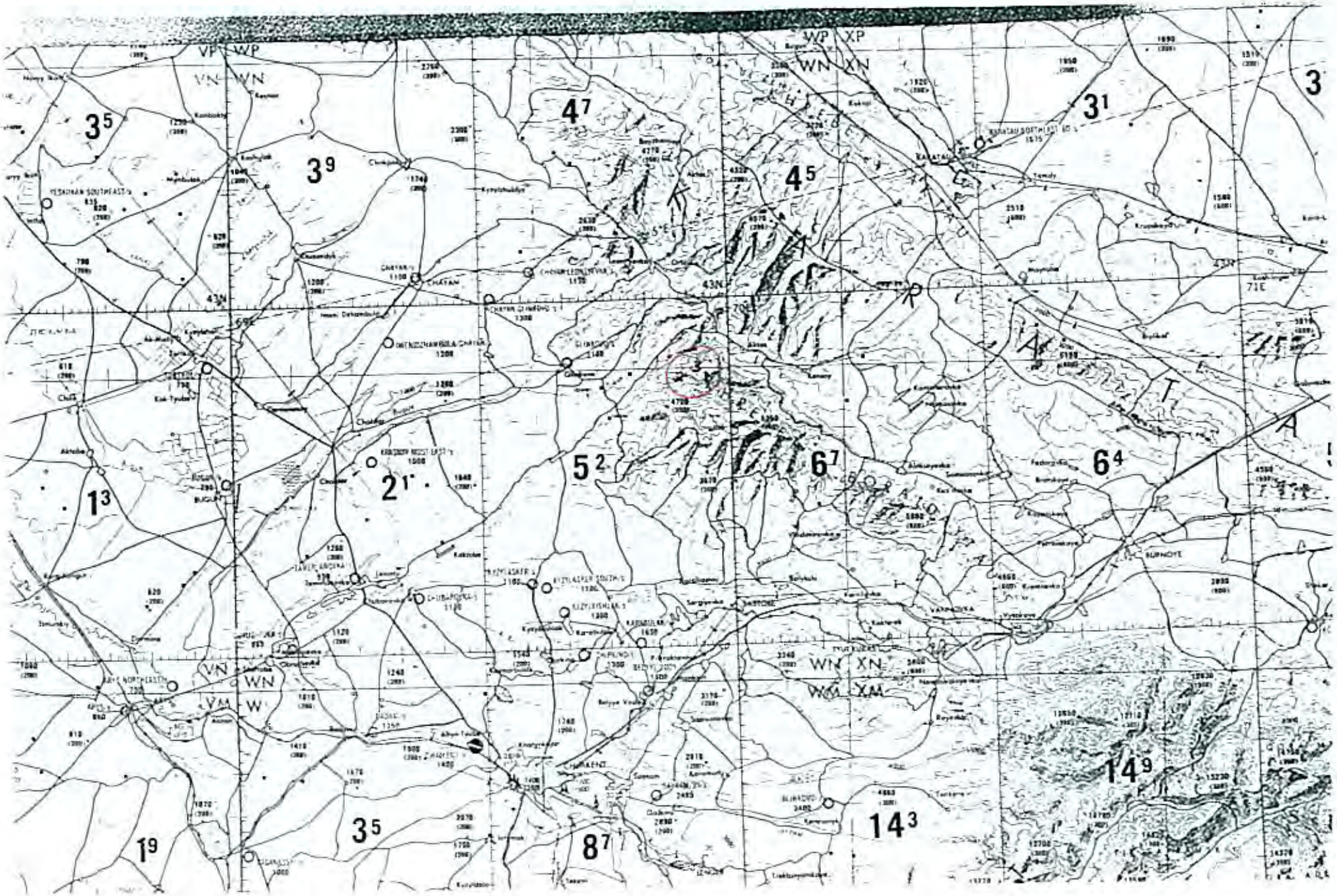


APPENDIX 5
MAP A/B



APPENDIX 5
MAP C/D

APPENDIX 5
MAP E



APPENDIX 5
MAP F

APPENDIX 6

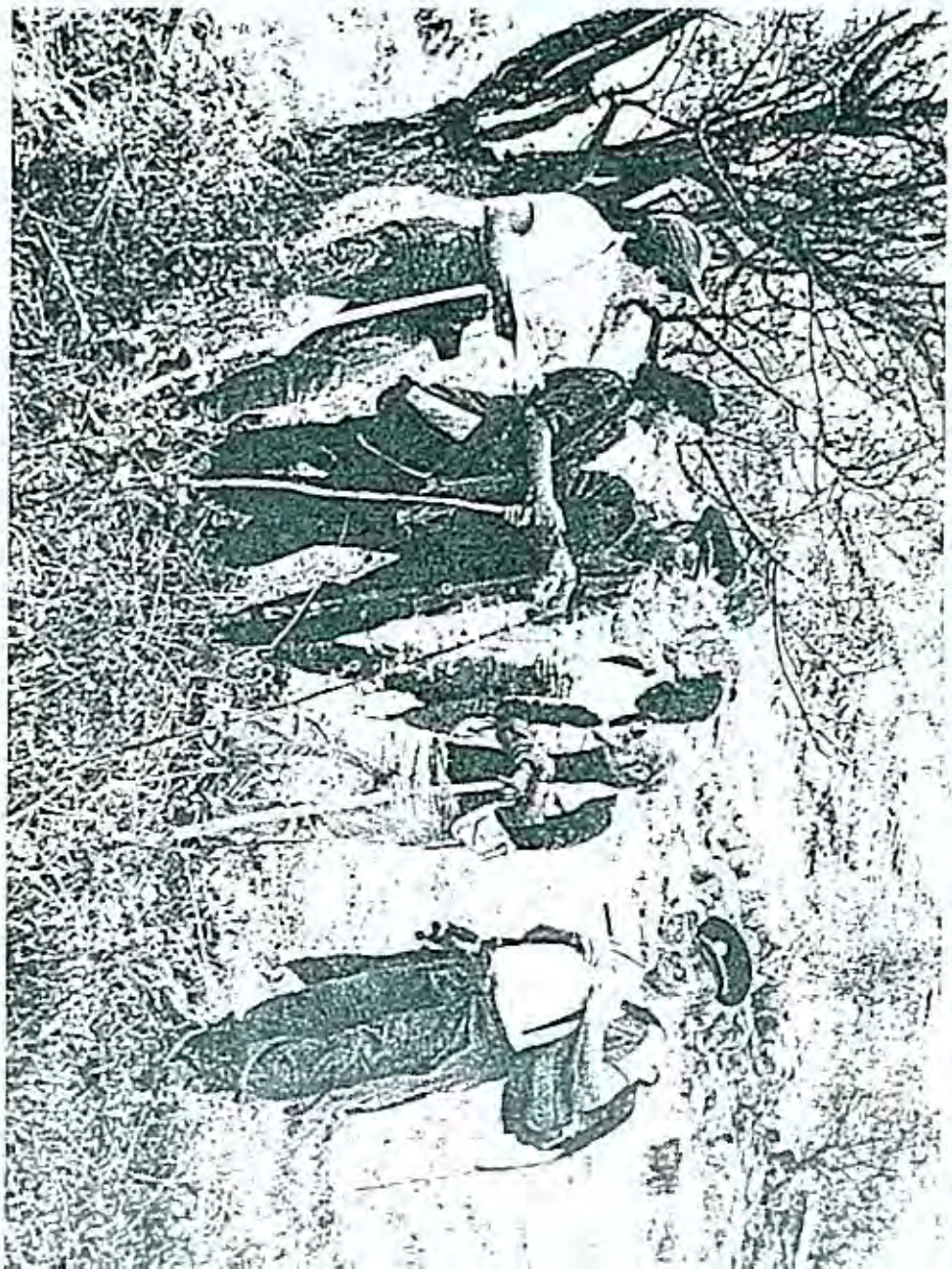
TABLE 1

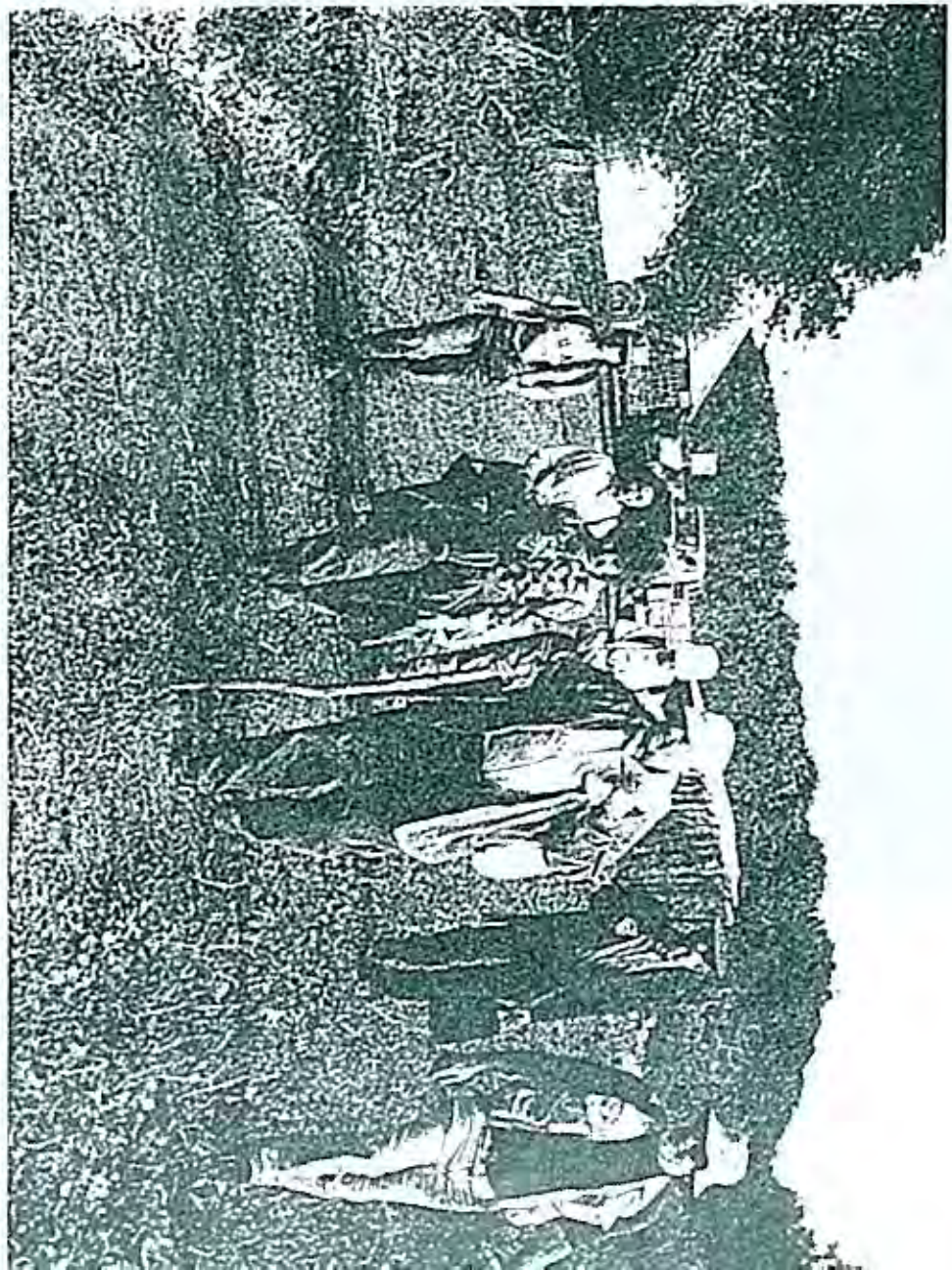
EXPEDITION SUMMARY

Expedition	Area	Date	Sites
A.	Topolevka area	9/10-9/13	1-24
	1. camp area	-	-
	2. West of camp	9/10	1-8
	3. East of camp	9/11	9-13
	4. South of camp	9/12	14-19
	5. Southeast of camp	9/13	20-24
B.	Lepsinsk area	9/13-9/14	25-30
	1. Village of Lepsinsk	-	-
	2. Southeast of village	9/14	25-30
C.	Alma-Ata area	9/14-9/18	31-36
	1. Alma-Ata hotel (SAVO)	-	-
	2. Quarantine Station	9/17	none
	3. NE of ALMa-Ata	9/17	31
	4. Further NE of Alma-Ata	9/17	32
	5. Smuryghin Lab	9/18	33-35,48
D.	Alma-Ata area extended	9/19	36
	1. East of Alma-Ata	9/19	36
E.	Boraldy area	9/20-9/21	37-41
	1. Boraldy/Karatau camp	-	-
	2. NW of camp	9/20	37
	3. West of camp	9/21	38-40
	4. South of camp	9/21	41
F.	Kyrgyzstan	9/22-9/23	42-47
	1. Kuomhama village	-	-
	2. NE of village	9/22	42
	3. West of village	9/23	43-45
	4. Further west of village	9/23	46,45

APPENDIX 6
PHOTO 1

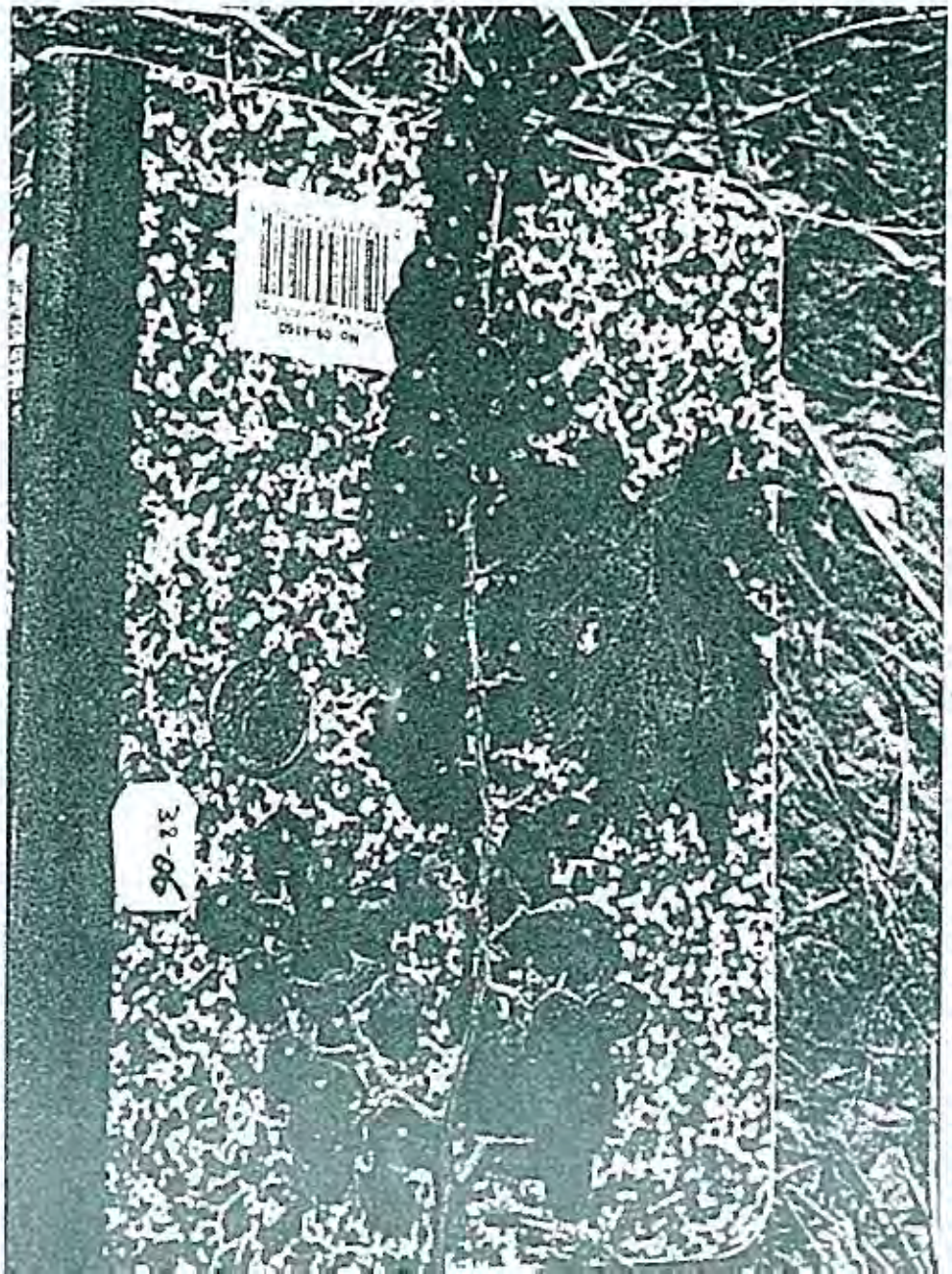
APPENDIX 6
PHOTO 2



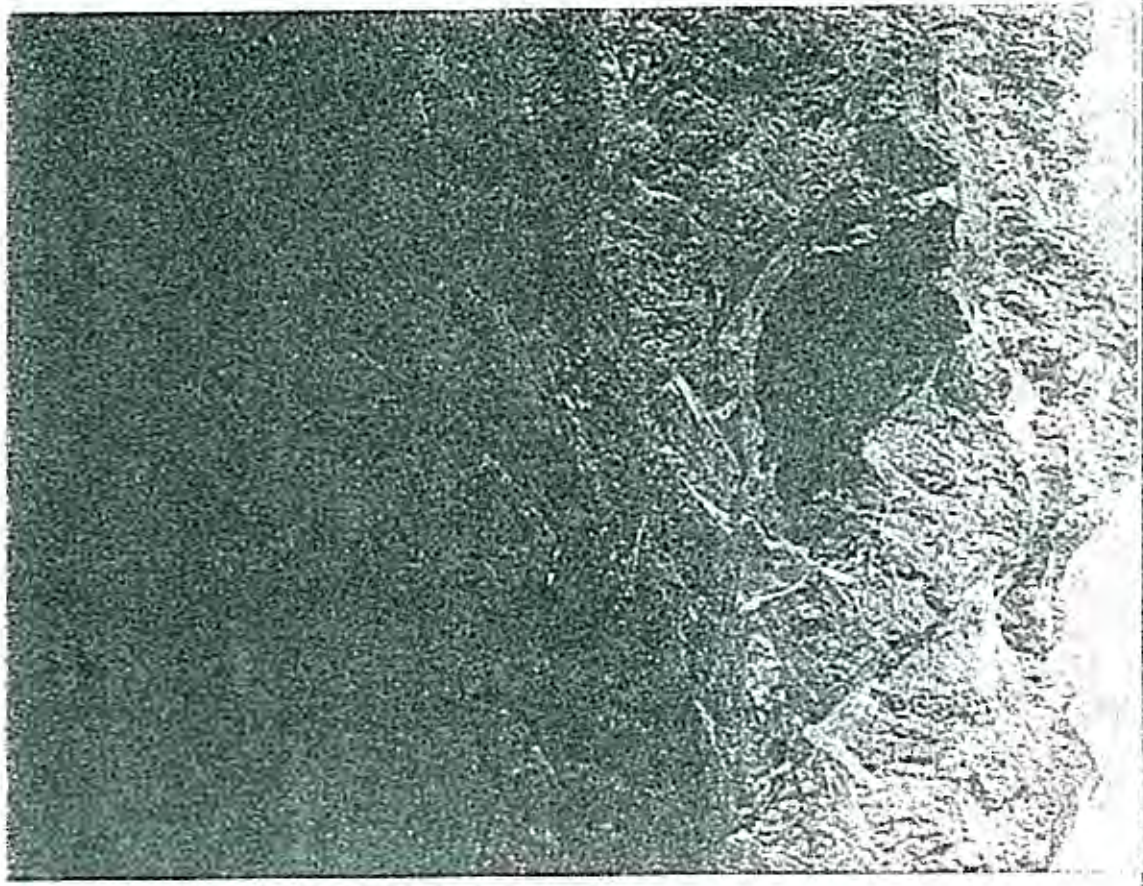


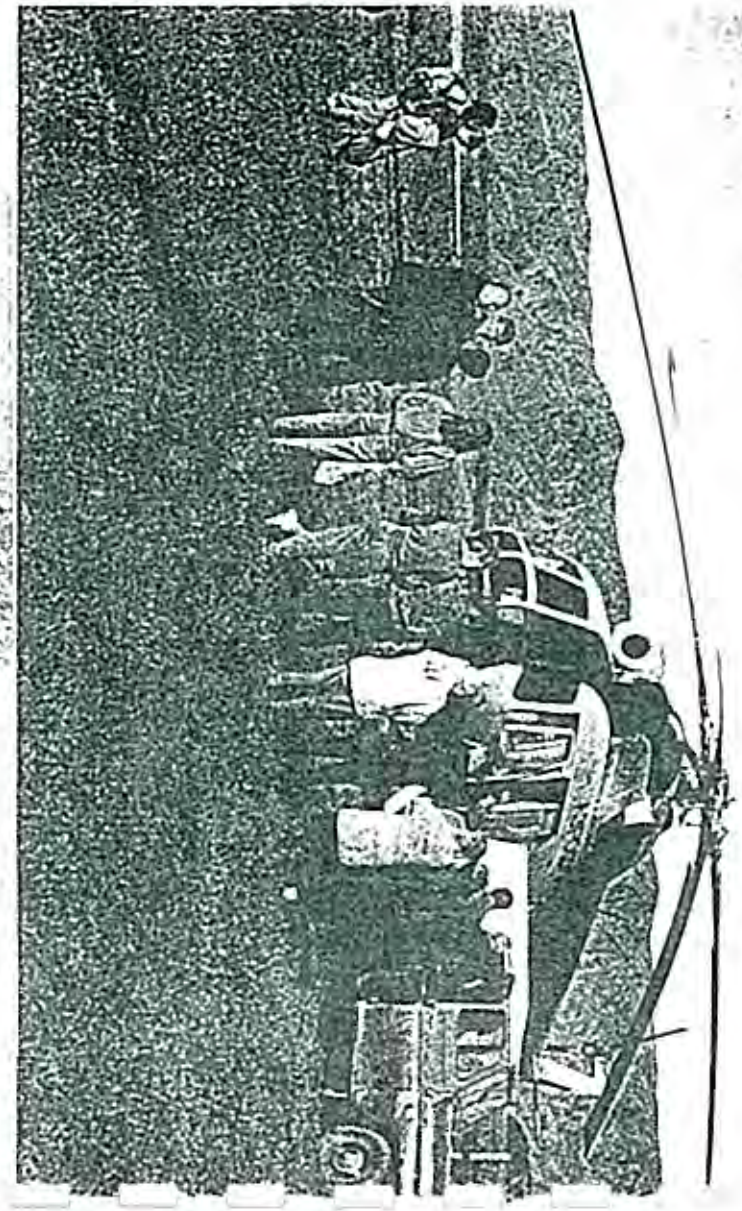
APPENDIX 6
PHOTO 3

APPENDIX 6
PHOTO 4



APPENDIX 6
PHOTO 5





APPENDIX 7

TABLE 2

EXPEDITION	DATE	COORDINATES LATITUDE	LONGITUDE	SITE	ELEV(m)
A	9/10	45° 24.35' N	80° 24.51' E	Forestry Camp	1310
		45° 24.30' N	80° 24.39' E	01	1295
		45° 24.14' N	80° 24.51' E	02	-
		45° 24.10' N	80° 24.33' E	03	1255
		45° 25.42' N	80° 24.22' E	04	1255
		45° 24.41' N	80° 24.51' E	05	1260
		45° 24.18' N	80° 24.24' E	06	1240
		45° 24.28' N	80° 24.21' E	07	1230
		45° 24.34' N	80° 24.17' E	08	1225
	9/11	45° 24.33' N	80° 25.92' E	09	1400
		45° 24.38' N	80° 25.85' E	10	1390
		45° 24.32' N	80° 25.67' E	11	1395
		45° 24.33' N	80° 25.67' E	12-01)	1365
		45° 24.34' N	80° 25.26' E	12-02)	"
		45° 24.66' N	80° 25.35' E	13	1385
	9/12	45° 24.27' N	80° 24.54' E	14	1315
		45° 24.21' N	80° 24.59' E	15	1335
		45° 24.17' N	80° 24.60' E	16	1350
		45° 24.18' N	80° 24.60' E	17	1365
		45° 24.31' N	80° 24.45' E	18	1285
		45° 24.30' N	80° 24.41' E	19	1285
	9/13	45° 22.93' N	80° 25.46' E	20	1980
		45° 23.39' N	80° 25.03' E	21	1780
		45° 23.63' N	80° 24.54' E	22	1540
		< 1 km from campsite		23	1380
		45° 24.23' N	80° 24.29' E	24	1305
B	9/14	45° 31.69' N	80° 36.69' E	Lepsinsk Cafe	1020
		45° 31.31' N	80° 43.31' E	25	1345
		45° 31.25' N	80° 43.86' E	26	1400
		45° 30.68' N	80° 42.89' E	27	1300
		45° 30.37' N	80° 42.96' E	28 & 29	1315
		45° 30.69' N	80° 42.91' E	30-01	1280
		45° 30.80' N	80° 42.93' E	30-02	1275
C	9/17	43° 12.22' N	76° 58.43' E	SAVO	-
		43° 17.71' N	77° 10.11' E	Quarantine Site	950
		43° 26.74' N	77° 27.18' E	31	690
		43° 20.87' N	77° 36.14' E	Composer's House	1100
		43° 19.77' N	77° 36.06' E	32	1280
	9/18	43° 30.65' N	77° 41.26' E	Smuryghin Lab	-
D	9/19	43° 15.67' N	77° 04.75' E	Kortur Bulak	1090
		43° 11.66' N	77° 07.15' E	36	1680
		43° 14.63' N	77° 09.32' E	Delbuluk	1430

APPENDIX 7

TABLE 2 - pg 2

EXPEDITION	DATE	COORDINATES LATITUDE	COORDINATES LONGITUDE	SITE	ELEV(m)
E	9/20	42° 52.57' N	69° 58.22' E	Boraldy Camp	920
		1 km N of camp		37-01	925
				37-02	975
		1 1/2 km N of camp		37-03	1020
		42° 52.84' N	69° 52.68' E	37-04	1050
		-	-	37-05,06	1068
		42° 52.84' N	69° 52.10' E	37-(07-10)	1200
	9/21	42° 52.94' N	69° 54.76' E	Camp No. 2	925
		42° 53.12' N	69° 54.78' E	38-(01-04)	925
		42° 53.14' N	69° 55.08' E	38-(05-12)	930
		42° 52.86' N	69° 55.30' E	39	930
		42° 52.49' N	69° 56.23' E	40	940
F	9/22	41° 18.83' N	72° 57.52' E	Koumhama, Kyrg.	
		41° 23.44' N	73° 06.34' E	42	1335
	9/23	41° 16.72' N	72° 52.81' E	43-45	1550
		41° 17.29' N	72° 50.03' E	46	1550
		41° 51.01' N	73° 07.57' E	Torkent, Kyrg.	-
		42° 45.76' N	75° 55.00' E	Buraldy, Kyrg.	-

Site: 01
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: 200 m SW of campsite
Elevation: 1295 m
Latitude: 45 24.30 N Longitude: 80 24.39 E
Soil: humus
Slope: 45 %
Popsize: 100 +
Rainfall: 750 - 800 mm
Plantsasc: Malus sieversii, Berberis sphaerocarpa, Rosa, Rhamnus, Crataegus jungalica, Humulus lupulus, Lonicera altmoni, Padus racemosa, Ribes meyeri

Site: 02
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: near Area of Bees
Latitude: 45 24.14 N Longitude: 80 24.51 E
Soil: humus
Slope: 45%
Rainfall: 750 - 800 mm
Plantsasc: Crataegus jungalica

Site: 03
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: near Area of Bees
Elevation: 1255 m
Latitude: 45 24.10 N Longitude: 80 24.33 E
Soil: humus
Rainfall: 750 - 800 mm
Plantsasc: Crataegus

Site: 04
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 1255 m
Latitude: 45 25.42 N Longitude: 80 24.22 E
Soil: humus
Slope: 30%
Rainfall: 750 - 800 mm
Plantsasc: Rubus

Site: 05
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: open meadow
Elevation: 1260 m
Latitude: 45 24.41 N Longitude: 80 24.51 E
Soil: humus
Slope: slight
Rainfall: 750 - 800 mm
Plantsasc: Humulus

Site: 06
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 1240 m
Latitude: 45 24.18 N Longitude: 80 24.24 E
Soil: humus
Slope: slight
Rainfall: 750 - 800 mm
Plantsasc: Urtica (nettles)

Site: 07
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: on top of small ridge
Elevation: 1230 m
Latitude: 45 24.28 N Longitude: 80 24.21 E
Soil: humus, pH neutral
Rainfall: 750 - 800 mm
Plantsasc: Crataegus

Site: 08
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 1225 m
Latitude: 45 24.34 N Longitude: 80 24.17 E
Soil: humus
Slope: slight
Popsize: 3 trees
Rainfall: 750 - 800 mm
Plantsasc:

Site: 09
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: plataeu before going over ridge, possibly good air drainage
Elevation: 1400 m
Latitude: 45 24.33 N Longitude: 80 25.92 E
Slope: W facing
Rainfall: 750 - 800 mm
Plantsasc: Padus racemosa, Crataegus altaica, Ribes meyeri, Lonicera altmoni, Berberis sphaerocarpa

Site: 10
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 1390 m
Latitude: 45 24.38 N Longitude: 80 25.85 E
Slope: W facing
Rainfall: 750 - 800 mm
Plantsasc:

Site: 11
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: near bottom of valley, old thicket
Elevation: 1395 m
Latitude: 45 24.32 N Longitude: 80 25.67 E
Slope: SW facing
Popsize: 20 +
Rainfall: 750 - 800 mm
Plantsasc:

Site: 12
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: bottom of valley
Elevation: 1365 m
Latitude: 45 24.33 N Longitude: 80 25.67 E
Soil: humus
Slope: S facing
Popsize: 50 +
Rainfall: 750 - 800 mm
Plantsasc:

Site: 13
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: steep to S and N
Elevation: 1385 m
Latitude: 45 24.66 N Longitude: 80 25.35 E
Slope: W facing ridge
Rainfall: 750 - 800 mm
Plantsasc: Populus tremuloides

Site: 14
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: ca. 1 km N of campsite
Elevation: 1315 - 1320 m
Latitude: 45 24.27 N Longitude: 80 24.54 E
Soil: humus
Slope: N facing
Rainfall: 750 - 800 mm
Plantsasc: Lonicera, Rhamnus

Site: 15
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: on plateau, uphill from site 14
Elevation: 1335 m
Latitude: 45 24.21 N Longitude: 80 24.59 E
Soil: humus
Slope: W facing
Popsize: many Malus
Rainfall: 750 - 800 mm
Plantsasc:

Site: 16
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 1350 m
Latitude: 45 24.17 N Longitude: 80 24.60 E
Soil: humus
Slope: NW facing
Popsize: 100 +
Rainfall: 750 - 800 mm
Plantsasc:

Site: 17
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: uphill from site 16, 50 m down from conifers at draw where stream runs S.
Elevation: 1375 m
Latitude: 45 24.18 N Longitude: 80 24.60 E
Soil: humus
Slope: 30% W facing
Rainfall: 750 - 800 mm
Plantsasc: Rubus, Crataegus, Abies

Site: 18
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: across valley and 70 m N of site 17, at base of S slope
Elevation: 1285 m
Latitude: 45 24.18 N Longitude: 80 24.45 E
Soil: drier
Slope: 10% s facing
Popsize: 100 +
Rainfall: 750 - 800 mm
Plantsasc: Crataegus, Prunus

Site: 19
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: on way back to camp
Elevation: 1285 m
Latitude: 45 24.30 N Longitude: 80 24.41 E
Popsize: large
Rainfall: 750 - 800 mm
Plantsasc: Rhamnus, Box elder

Site: 20
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 2005 m
Latitude: 45 22.93 N Longitude: 80 25.46 E
Soil: shallow, exposed rock
Slope: 35% E facing
Popsize: 10 + Sorbus
Rainfall: 750 - 800 mm
Plantsasc: Lonicera, Picea transiberia, Pinus siberica, Pinus shirinkeranae, Juniperus, thistles

Site: 21
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location:
Elevation: 1780 m
Latitude: 45 23.39 N Longitude: 80 25.03 E
Soil: rocky
Slope: 45% W facing
Rainfall: 750 - 800 mm
Plantsasc: Fragaria, Populus tremuloides, Rosa, Gentiana, Heracleum, Daucus, Rumex, Cotoneaster, Lonicera, Stellaria, Ranunculus, Hypericum

Site: 22
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: At end of ridge, facing W
Elevation: 1540 m
Latitude: 45 23.63 N Longitude: 80 24.54 E
Soil: moist humus
Slope: NW facing slope
Rainfall: 750 - 800 mm
Plantsasc: Populus tremuloides

Site: 23
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: less than 1 km S of campsite, W side of road
Elevation: 1380 m
Soil: moist humus
Slope: 45% NW facing
Rainfall: 750 - 800 mm
Plantsasc: Crataegus, Berberis, Populus tremuloides, Fragaria

Site: 24
Country: Kazakhstan
City: Sarkand, Village of Topolevka
Localname: Forestry Camp #16, Topolevka Forestry Area, Taldy-Kurgan region, Soldier's Gorge, Dzhungarsky Alatau
Location: just S of campsite, E side of road
Elevation: 1305 m
Latitude: 45 24.23 N Longitude: 80 24.29 E
Soil: moist humus
Slope: 20% NW facing
Rainfall: 750 - 800 mm
Plantsasc: Rhamnus, Crataegus, Quercus, Tilia

Site: 25
Country: Kazakhstan
City: Lepsinsk
Localname: Black River Forestry Camp, Dodakalava Ridge ?, Dzhungarsky Alatau
Location: near Black RIver Camp
Elevation: 1345 m
Latitude: 45 31.31 N Longitude: 80 43.55 E
Slope: 10 - 20% NW
Plantsasc: Prunus, Chrysanthemum

Site: 26
Country: Kazakhstan
City: Lepsinsk
Localname: Black River Forestry Camp, Dodakalava Ridge ?, Dzhungarsky Alatau
Location: sunny area
Elevation: 1400 m
Latitude: 45 31.25 N Longitude: 80 43.86 E
Soil: moist humus
Slope: S facing
Popsize: large, widespread
Plantsasc: lush vegetation, Quercus, thistle, grass

Site: 27
Country: Kazakhstan
City: Lepsinsk
Localname: Black River Forestry Camp, Dodakalava Ridge ?, Dzhungarsky Alatau
Location: grazed meadow
Elevation: 1300 m
Latitude: 45 30.68 N Longitude: 80 42.89 E
Soil: humus
Slope: 10%
Plantsasc: Fragaria, Lonicera, grass

Site: 28
Country: Kazakhstan
City: Lepsinsk
Localname: Black River Forestry Camp, Dodakalava Ridge ?, Dzhungarsky Alatau
Location:
Elevation: 1315 m
Latitude: 45 30.37 N Longitude: 80 42.96 E
Slope: W facing
Plantsasc:

Site: 29
Country: Kazakhstan
City: Lepsinsk
Localname: Black River Forestry Camp, Dodakalava Ridge ?, Dzhungarsky Alatau
Location:
Elevation: 1300 m
Latitude: 45 30.68 N Longitude: 80 42.89 E
Slope: 10% E facing
Plantsasc:

Site: 30
Country: Kazakhstan
City: Lepsinsk
Localname: Black River Forestry Camp, Dodakalava Ridge ?, Dzhungarsky Alatau
Location: at edge of flat cultivated area, edge of Malus forest with defoliation
Elevation: 1280 m
Latitude: 45 30.69 N Longitude: 80 42.91 E
Soil: dry
Slope: W facing
Plantsasc:

Site: 31
Country: Kazakhstan
City: Aktogai Village
Localname: Issyk Arboretum
Location:
Elevation: 690 m
Latitude: 43 26.74 N Longitude: 77 27.18 E
Slope: Flat
Plantsasc: 60 species of Crataegus and many other Kazakh species, lots of buckthorn.

Site: 32
Country: Kazakhstan
City: Turgen village
Localname: Kamenka Gorge (Stone Gorge)
Location: East of Arboretum, near Composer's house retreat
Elevation: 1275 m
Latitude: 43 19.77 N Longitude: 77 36.06E
Soil: Rocky
Slope: Near stream
Popsize: 50
Plantsasc: Buckthorne, Apricot, Betula

Site: 33
Country: Kazakhstan
City: Malovdnoe Village
Localname: State Farm (Dr. Smuryghin)
Location:
Elevation: 930 m
Latitude: 43 30.65 N Longitude: 77 41.26 E
Plantsasc:

Site: 34
Country: Kazakhstan
City: Malovdnoe Village
Localname: State Farm (Dr. Smuryghin)
Location:
Elevation: 930 m
Latitude: 43 30.65 N Longitude: 77 41.26E
Plantsasc:

Site: 35
Country: Kazakhstan
City: Malovdnoe Village
Localname: State Farm (Dr. Smuryghin)
Location:
Elevation: 930 m
Latitude: 43 30.65 N Longitude: 77 41.26E
Plantsasc:

Site: 36
Country: Kazakhstan
City: near Alma Ata
Localname: Kotur Balak "Dirty Water", Delbalak "Clean Water", Kherbet Zailiysky Alatau
Location: 30 m N of stream in gorge
Elevation: 1680 m
Latitude: 43 11.66 N Longitude: 77 07.15 E
Soil: moist humus, deep brown
Slope: 45% N facing
Popsize: 30 - 40
Plantsasc: cultivated apricot, Sorbus, Lonicera tartarica

Site: 37
Country: Kazakhstan
City: near Chimkent
Localname: Boralday Forestry Region, Boralday Mountain, Khrebet Karatau
Location: 1 km N of forestry camp, near dry ravine
Elevation: 925-1200 m
Latitude: 42 52.84 N Longitude: 69 52.10 E
Soil: dry, rocky
Slope: E facing
Rainfall: 350 mm
Plantsasc: Fraxinus, Crataegus pontica, Amygdalus, Rosa, Spirianthus shrenkii, Ephedra, Pistacia vera

Site: 38
Country: Kazakhstan
City: near Chimkent
Localname: Boralday Forestry Region, Buldergen Gorge, Boralday Mountain, Khrebet Karatau
Location: 20 m uphill from stream
Elevation: 925 m
Latitude: 42 53.12 N Longitude: 69 54.78 E
Soil: 60% SE facing
Rainfall: 350 mm
Plantsasc:

Site: 39
Country: Kazakhstan
City: near Chimkent
Localname: Boralday Forestry Region, Buldergen Gorge, Boralday Mountain, Khrebet Karatau
Location: 1.5 km S of Sergei's campsite, upstream, well exposed, flat low plataeu, 3-4 m above stream, high ro
Elevation: 930 m
Latitude: 42 52.86 N Longitude: 69 55.30 E
Soil: sandy, rocky
Rainfall: 350 mm
Plantsasc: Clematis orientalis

Site: 40
Country: Kazakhstan
City: near Chimkent
Localname: Boralday Forestry Region, Buldergen Gorge, Boralday Mountain, Khrebet Karatau
Location: most S point of trip, at spring. 5 m from stream.
Elevation: 940 m
Latitude: 42 52.49 N Longitude: 69 56.23 E
Soil: river bottom
Rainfall: 350 mm
Plantsasc: Fraxinus

Site: 41
Country: Kazakhstan
City: near Chimkent
Localname: Boralday Forestry Region, Boralday Mountain, Khrebet Karatau
Location: not far from forestry camp, SW
Rainfall: 350 mm
Plantsasc: Pistacia vera, Malus kirghisorum, Malus sieversii

Site: 42
Country: Kyrgystan
City: near Dzhalal-abad
Localname: Koumhama Village, Ferganskiy Kherbet
Location: open grazed meadow, at edge of hill and flat area, NE of village
Elevation: 1335 m
Latitude: 41 23.44 N Longitude: 73 06.34 E
Soil: dry, humus
Slope: SE facing
Rainfall: 700 - 1700 mm (1190 mm ave.)
Plantsasc: Prunus sogdiana

Site: 43
Country: Kyrgystan
City: near Dzhalal-abad
Localname: Koumhama Village, Ferganskiy Kherbet
Location: West of Village
Elevation: 1550 m
Latitude: 41 16.72 N Longitude: 72 52.81 E
Rainfall: 700 - 1700 mm (1190 mm ave.)
Plantsasc:

Site: 44
Country: Kyrgystan
City: near Dzhalal-abad
Localname: Koumhama Village, Ferganskiy Kherbet
Location: name of gorge means Crataegus, west of village
Elevation: 1550 m
Latitude: 41 16.72 N Longitude: 72 52.81 E
Soil: dry
Slope: 10% S facing
Rainfall: 700 - 1700 mm (1190 mm ave.)
Plantsasc: Acer turkestanica, Crataegus turkestanica, Cotoneaster, Juglans regel, Rosa, Lonicera

Site: 45
Country: Kyrgystan
City: near Dzhalal-abad
Localname: Koumhama Village, Ferganskiy Kherbet
Location: West of Village
Elevation: 1550 m
Latitude: 41 16.72 N Longitude: 72 52.81 E
Rainfall: 700 - 1700 mm (1190 mm ave.)
Plantsasc:

Site: 46
Country: Kyrgystan
City: near Dzhalal-abad
Localname: Koumhama Village, Ferganskiy Kherbet
Location: Further west of Village
Elevation: 1550 m
Latitude: 41 17.29 N Longitude: 72 50.03 E
Slope: slight SW facing
Rainfall: 700 - 1700 mm (1190 mm ave.)
Plantsasc:

Site: 47
Country: Kyrgystan
City: near Dzhalal-abad
Localname: Koumhama Village, Ferganskiy Kherbet
Location: Further west of Village
Elevation: 1550 m
Latitude: 41 17.29 N Longitude: 72 50.03 E
Slope: slight SW facing
Rainfall: 700 - 1700 mm (1190 mm ave.)
Plantsasc: plants selected from the wild

Site: 48
Country: Kazakhstan
City: Malovdnoe Village
Localname: State Farm (Dr. Smuryghin)
Location:
Elevation: 930 m
Latitude: 43 30.65 N Longitude: 77 41.26 E
Plantsasc:

Local Number: GMAL 3526
Date: 10 Sep 93
Site: 01 Plantnum: 01
Species: Malus sieversii
Height: 12 m
Habit: spreading
Fruitsize:
Fruitshape:
Fruitcolor: pale green to yellow, no blush, waxy
Taste: astringent
Frdisease: a few fruit have canker
Ledisease: scab
Leinsect: few, scattered leaf spots
Other: TP - 27 form 1. (Djangaliev's study tree)

Local Number: GMAL 3527
Date: 10 Sep 93
Site: 02 Plantnum: 01
Species: Malus sieversii
Height: 6 - 8 m
Habit: compact
Spur: short productive
Fruitsize:
Fruitshape: oblong
Fruitcolor: yellow, no bloom, waxy
Taste: good, sweet, hard texture
Frdisease: no scab
Leafshape: long
Ledisease: scab ?
Leinsect: red spider mite, no aphids
Other:

Local Number: GMAL 3528
Date: 10 Sep 93
Site: 03 Plantnum: 01
Species: Malus sieversii
Height: 10 m
Habit: drooping
Branches: long
Fruitsize: small, cherry-like
Fruitshape: round , very long pedicel., persistant calyx
Fruitcolor: pale green or yellow
Taste: acid
Frdisease: scab ++
Other: TP -25 form 10. Propagated in Alma Ata Botanical Garden. Oldest tree in forest, 100 years.

Local Number: GMAL 3529
Date: 10 Sep 93
Site: 04 Plantnum: 01
Species: Malus sieversii
Height: 12 m
Branches: thin, long
Spur: Golden Delicous type
Fruitsize: medium
Fruitshape:
Fruitcolor: greenish-yellow
Taste: very astringent, early ripening
Frdisease: scab
Frinsect: red mites
Leafshape: round
Other:

Local Number: GMAL 3530
Date: 10 Sep 93
Site: 04 Plantnum: 02
Species: Malus sieversii
Height: 12 m
Habit: short, spreading
Fruitsize:
Fruitshape: flat top, persistent calyx
Fruitcolor: yellowish, very waxy
Taste: very acid, over mature
Frdisease: scab
Leafshape: long, petiole 1.5 cm
Other:

Local Number: GMAL 3531
Date: 10 Sep 93
Site: 05 Plantnum: 01
Species: Malus sieversii
Height: 12 m
Habit: spreading
Fruitsize: small
Fruitshape: 3 - 4 cm pedicel, calyx persistent
Fruitcolor: red strip on yellow background
Taste: bland, very ripe
Frdisease: scab ++
Leafshape: small, elongated normal type
Other:

Date: 10 Sep 93
Site: 05 Plantnum: 02
Species: Humulus
Fruitsize:
Fruitshape:
Other:

Local Number: GMAL 3532
Date: 10 Sep 93
Site: 06 Plantnum: 01
Species: Malus sieversii
Height: 12 m
Habit: spreading
Spur: short production
Fruitsize:
Fruitshape:
Fruitcolor: yellow white
Taste: acidic, astringent
Frdisease: scab
Leafshape: long
Ledisease: scab +
Other:

Local Number: GMAL 3533
Date: 10 Sep 93
Site: 07 Plantnum: 01
Species: Malus sieversii
Height: 15 m
Habit: spreading
Spur: long production
Fruitsize:
Fruitshape:
Fruitcolor: yellow white
Taste: acidic
Frdisease: scab +
Leafshape: short petiole
Other:

Date: 10 Sep 93
Site: 07 Plantnum: 02
Species: Crataegus
Fruitsize:
Fruitshape:
Other:

Local Number: GMAL 3534
Date: 10 Sep 93
Site: 08 Plantnum: 01
Species: Malus baccata
Height: 2 m
Fruitsize: 1.0 cm
Fruitshape:
Fruitcolor: red
Other:

Local Number: GMAL 3535
Date: 11 Sep 93
Site: 09 Plantnum: 01
Species: Malus sieversii
Height: 9 m
Habit: spreading
Spur: short production
Fruitsize: 5.0 x 5.5 cm
Fruitshape:
Fruitcolor: red strip, whitish yellow background, red veins
Frdisease: scab
Leafshape: elongated, normal
Other: fruit low density, high tannin

Local Number: GMAL 3536
Date: 11 Sep 93
Site: 09 Plantnum: 02
Species: Malus sieversii
Height: 9 m
Habit: spreading
Fruitsize: large, 5.2 x 6.0 cm
Fruitshape:
Fruitcolor: like White Transparent , Russian Yellow
Taste: aromatic, acid
Frdisease: clean
Leafshape: round, soft, thin
Ledisease: scab, some fungal leaf spot
Other: fruit low density; TA - 28 31/17

Local Number: GMAL 3537
Date: 11 Sep 93
Site: 09 Plantnum: 03
Species: Malus sieversii
Height: 8 m
Habit: spreading
Spur: spur type
Fruitsize: 4.3 x 3.4 cm
Fruitshape:
Fruitcolor: greenish yellow
Taste: bitter, somewhat aromatic, mealy
Frdisease: scab ++
Leafshape: elongated, long petiole
Ledisease: scab ++
Leinsect: none
Other: high phenol content

Local Number: GMAL 3538
Date: 11 Sep 93
Site: 10 Plantnum: 01
Species: Malus sieversii
Height: 8 - 10 m
Habit: spreading
Fruitsize: small, 3.0 x 2.8 cm
Fruitshape:
Fruitcolor: green yellow, red blush
Taste: sour, astringent
Frdisease: scab +
Leafshape: roundish
Ledisease: leaf spot
Other: TS - 15 form 1S, 31/16

Local Number: GMAL 3539
Date: 11 Sep 93
Site: 11 Plantnum: 01
Species: Malus sieversii
Habit: spreading
Spur: short production
Fruitsize: medium, 3.6 x 4.2 cm
Fruitshape: round
Fruitcolor: faint strip on green yellow background
Taste: sour, mealy, overripe
Frdisease: scab
Leafshape: normal
Other: old tree

Local Number: GMAL 3540
Date: 11 Sep 93
Site: 12 Plantnum: 01
Species: Malus sieversii
Height: 8 - 10 m
Habit: spreading
Fruitsize: medium large, 4.0 x 4.0 cm
Fruitshape: elongated
Fruitcolor: yellow green, red blush
Taste: balance between acidity and sweetness. not green
Ledisease: rust?
Other: breeding potential, TS - 17 form 4 S, 31/15

Local Number: GMAL 3541
Date: 11 Sep 93
Site: 12 Plantnum: 02
Species: Malus sieversii
Height: 8 m
Fruitsize: small, 2.6 x 2.2 cm
Fruitshape: round
Fruitcolor: bright carmine, nearly all over. yellow flesh
Taste: bad, very gritty
Frdisease: scab
Ledisease: scab
Other: breeding potential, iron deficiency? or early senescence

Local Number: GMAL 3542
Date: 11 Sep 93
Site: 12 Plantnum: 03
Species: Malus sieversii
Height: 8 m
Habit: upright
Spur: spur type
Fruitsize: 4.0 x 3.8 cm
Fruitshape: elongated
Fruitcolor: yellow white
Taste: sweet, astringent
Frdisease: water core, occ. scab
Ledisease: no scab
Other: non-vigorous, covered with hops

Local Number: GMAL 3543
Date: 11 Sep 93
Site: 12 Plantnum: 04
Species: Malus sieversii
Height: 10 m
Habit: upward spreading
Fruitsize: medium large, 4.3 x 4.2 cm
Fruitshape: round, flat
Fruitcolor: green yellow with red blush
Taste: astringent, acidic, unripe
Frdisease: scab
Other: healthy overall. alt. 1360 m; 45 24.39 N, 80 25.26 E

Date: 11 Sep 93
Site: 12 Plantnum: 05
Species: Humulus
Fruitsize:
Fruitshape:
Other:

Local Number: GMAL 3544
Date: 11 Sep 93
Site: 13 Plantnum: 01
Species: Malus sieversii
Height: 8 - 10 m
Habit: spreading
Fruitsize: small, 3.1 x 3.2 cm
Fruitshape: round
Fruitcolor: yellow
Taste: very sweet, very bitter, dry flesh
Frdisease: scab ++
Leafshape: long
Other: Populus tremuloides

Local Number: GMAL 3545
Date: 12 Sep 93
Site: 14 Plantnum: 01
Species: Malus kirghisorum
Height: 11 m
Habit: spreading
Spur: spur on longer shoots
Fruitsize: small, 2.7 x 2.6 cm
Fruitshape:
Fruitcolor: green, hard
Taste: bitter
Frdisease: scab ++
Leafshape: lower leaves dead
Ledisease: scab ++, no leaf curl
Other: heavily fruiting, 150 years old, near streambed, indestinguishable from Malus sieversii

Local Number: GMAL 3546
Date: 12 Sep 93
Site: 14 Plantnum: 02
Species: Malus sieversii
Height: 11 m
Fruitsize: 4.0 x 3.7 cm
Fruitshape: roundish
Fruitcolor: yellow green
Taste: acidic , somewhat aromatic
Frdisease: scab ++
Ledisease: scab, red fungal leaf spot
Other: oxidizes rapidly, S facing slope, 150 m N of 14-01

Local Number: GMAL 3547
Date: 12 Sep 93
Site: 15 Plantnum: 01
Species: Malus sieversii
Height: 11 m
Habit: spreading
Spur: modified spur bearing
Fruitsize: small, 3.2 x 3. 0 cm
Fruitshape:
Fruitcolor: green
Taste: acidic
Frdisease: scab ++
Ledisease: scab; round, brown, necrotic spots w fruit bodies
Other: isolated, looks like M. kirgisorum, oxidizes rapidly, hops

Local Number: GMAL 3548
Date: 12 Sep 93
Site: 16 Plantnum: 01
Species: Malus sieversii
Height: 9 m
Habit: spreading
Fruitsize: 3.5 x 3.2 cm
Fruitshape:
Fruitcolor: yellow, green at calyx
Taste: bland, slightly acidic, slightly aromatic
Frdisease: scab
Leafshape: round
Ledisease: scab, some reddish leaf spot
Other: sunny area, last tree before the meadow

Local Number: GMAL 3549
Date: 12 Sep 93
Site: 17 Plantnum: 01
Species: Malus sieversii
Height: 12 m
Habit: spreading, horizontal branches
Branches: huge scaffold branches at wide angles
Spur: modified spur
Fruitsize: small, 4.0 x 3.5 cm
Fruitshape:
Fruitcolor: greenish with yellow cast
Taste: astringent, aromatic, flavorful
Frdisease: scab
Other: one of the highest trees in the area, leaning towards slope

Local Number: GMAL 3550
Date: 12 Sep 93
Site: 18 Plantnum: 01
Species: Malus sieversii
Height: 10 m
Fruitsize: large, 3.8 x 4.0 cm
Fruitshape:
Fruitcolor: yellow
Taste: good balance, aromatic, acidic, juicy, nice flavor
Frdisease: scab
Leafshape: roundish, healthy
Ledisease: few scab, maybe resistance reaction to scab
Other: multiple trunks

Local Number: GMAL 3551
Date: 12 Sep 93
Site: 19 Plantnum: 01
Species: Malus kirghisorum
Height: 9 m
Habit: spreading
Spur: spur type
Fruitsize: large, 4.7 x 4.7 cm, large carpels
Fruitshape:
Fruitcolor: red strips with yellow background
Taste: aromatic, acidic, dry, nice flavor
Frdisease: scab +
Leafshape: healthy
Ledisease: scab
Leinsect: spider mite ++
Other: wet soil, multiple trunks

Local Number: GMAL 3552
Date: 12 Sep 93
Site: 19 Plantnum: 02
Species: Malus kirghisorum
Habit: erect, bearing at top of tree
Branches: few side branches
Fruitsize: 4.0 x 4.0 cm
Fruitshape: round
Fruitcolor: yellow with slight green cast
Taste: very astringent, bad flavor
Frdisease: scab
Ledisease: scab
Other: 80 m from 19-01, sl up slope towards W, 1% slope, 1290 m, on NW ridge

Date: 13 Sep 93
Site: 20 Plantnum: 01
Species: Sorbus siberica
Height: 3 m
Habit: full tree, spreading
Fruitsize: 1 cm diameter, 10 - 20 berries per infructescence
Fruitshape: round
Fruitcolor: reddish orange
Taste: terrible
Leafshape: 15 leaflets/leaf, fall coloration
Other: very fruitful

Date: 13 Sep 93
Site: 21 Plantnum: 01
Species: Malus sieversii
Fruitsize: 2.2 x 2.5 cm
Fruitshape:
Fruitcolor: green, immature
Taste: bitter, hard
Frdisease: scab
Ledisease: scab
Other: Scion cutting taken, oxidizes quickly, at high elevation, sample from highest elevation collected

Date: 13 Sep 93
Site: 22 Plantnum: 01
Species: Ribes meyeri
Fruitsize: less than 1 cm diameter
Fruitshape: round
Fruitcolor: deep purple, black
Leafshape: lobed, like maple leaf
Ledisease: few fungal spots
Leinsect: insect galls
Other: nitrogen deficient

Local Number: GMAL 3553
Date: 13 Sep 93
Site: 23 Plantnum: 01
Species: Malus sieversii
Fruitsize:
Fruitshape: round, flat, short pedicle
Fruitcolor: red block with strip, bright carmine
Taste: acidic, aromatic, astringent, mealy, not bad flavor
Frdisease: scab
Other: early maturing, most fruit had dropped

Local Number: GMAL 3554
Date: 13 Sep 93
Site: 24 Plantnum: 01
Species: Malus sieversii
Height: 8 - 10 m
Habit: upright
Spur: erect spurs
Fruitsize: 5.5 x 5.0 cm
Fruitshape: round
Fruitcolor: Gala type, red carmine strip on yellow background
Taste: aromatic, somewhat bitter, not astringent, good flavor
Frdisease: scab
Ledisease: none
Leinsect: one aphid
Other: Rhamnus, one of best apples found

Local Number: GMAL 3555
Date: 13 Sep 93
Site: 24 Plantnum: 02
Species: Malus sieversii
Height: 15 m
Fruitsize: 5.25 x 4.5 cm
Fruitshape: round, flat, medium pedicel length
Fruitcolor: green, immature
Taste: somewhat aromatic, starchy, grassy flavor
Frdisease: scab
Ledisease: rust lesions, tan necrotic spots
Other: fruitful, desirable, oxidizes quickly

Local Number: GMAL 3556
Date: 14 Sep 93
Site: 25 Plantnum: 01
Species: Malus sieversii
Height: 6 - 8 m
Fruitsize: small
Fruitshape:
Fruitcolor: green yellow, waxy
Taste: somewhat sweet , hard, cardboard texture
Frdisease: scab +++
Ledisease: scab +++
Other: growth stunted by severe scab, much underbrush

Date: 14 Sep 93
Site: 25 Plantnum: 02
Species: Ribes meyeri
Height: 2 m
Habit: bush, multiple stalks
Fruitsize: less than 1 cm diameter
Fruitshape: round
Fruitcolor: deep purple, black
Ledisease: No chlorosis
Other: in shade of 25-01

Local Number: GMAL 3557
Date: 14 Sep 93
Site: 26 Plantnum: 01
Species: Malus sieversii
Habit: semi-erect
Spur: spur bearing
Fruitsize: 3.5 x 3.0 cm
Fruitshape:
Fruitcolor: green, immature
Taste: faintly sweet, somewhat astringent
Frdisease: scab
Ledisease: scab
Other: frost tolerant

Local Number: GMAL 3558
Date: 14 Sep 93
Site: 27 Plantnum: 01
Species: Malus sieversii
Habit: widely spreading
Branches: long, thin, Golden Delicious type
Spur: not spur type
Fruitsize: 3.5 x 3.2 cm
Fruitshape: round, medium long pedicels
Fruitcolor: green, glossy
Taste: very acidic
Ledisease: scab; reddish brown circular lesion; necrotic circle with green cente
Other: single tree in open area

Date: 14 Sep 93
Site: 28 Plantnum: 01
Species: Ribes meyeri
Height: 2 m
Fruitsize: .75 - 1.0 cm diam
Fruitshape: round
Fruitcolor: deep purple, black
Taste: acidic, fleshy
Other: fruitful

Date: 14 Sep 93
Site: 29 Plantnum: 01
Species: Rubus
Height: < 1 m
Habit: sprawling
Fruitsize: large, 8 - 10 druplets/fruit
Fruitshape: globose
Fruitcolor: deep purple
Taste: sweet, fleshy, not much taste
Leafshape: large, 3 leaflets per leaf
Other: small, short thorns

Local Number: GMAL 3559
Date: 14 Sep 93
Site: 30 Plantnum: 01
Species: Malus sieversii
Height: 10 - 12 m
Habit: very broad and squat, one major trunk
Branches: Golden Delicious type
Fruitsize: medium large, 3.3 x 3.4 cm
Fruitshape: medium pedicel length
Fruitcolor: yellow, glossy, overripe
Taste: sweet, bland, very mealy
Frdisease: scab ++
Ledisease: scab, red circular necrotic spot, scorched lvs on one side of tree
Other: corresponds to tree #4.

Local Number: GMAL 3560
Date: 14 Sep 93
Site: 30 Plantnum: 02
Species: Malus sieversii
Height: 8 - 10 m
Habit: broad as high
Branches: short
Spur: spur type
Fruitsize: medium
Fruitshape:
Fruitcolor: yellow green
Taste: sweet, acidic, some astringency, almost nice flavor
Frdisease: scab
Frinsect: strange dimpling on fruit
Leafshape: normal
Ledisease: scab; N and SE side of tree, scorched defoliation
Other: dry scant soil, other trees in area also with scorched defoliation, oxidizes quickly, 1270 m, 45 30.80 N, 80 42.93 E.

Local Number: GMAL 3561
Date: 14 Sep 93
Site: 30 Plantnum: 03
Species: Malus sieversii
Height: 8 m
Habit: broader than tall
Fruitsize: medium small, 2.5 x 3.1 cm
Fruitshape: round
Fruitcolor: yellow green with red blush
Taste: aromatic, acidic, somewhat astringent, juicy
Frdisease: scab +
Frinsect: dimpling on fruit matched by small thread of necrotic tissue in flesh
Ledisease: scab ++, some defoliation
Other: tree #3, 45% W facing slope, 1275 m

Date: 17 Sep 93
Site: 31 Plantnum: 01
Species: Crataegus sp.
Height: 8 m
Habit: spreading
Fruitsize: 1.5 cm
Fruitshape: round
Fruitcolor: orange-red
Taste: flavorful
Other: seeds collected

Date: 17 Sep 93
Site: 31 Plantnum: 02
Species: Malus kirghisorum
Fruitsize:
Fruitshape: long pedicle
Fruitcolor: greenish-yellow, orange-pink blush
Taste: sweet, little acid
Other: cuttings, resistant to frost and winter dryness, cultivar-Ketmen Dessert, good storage, late ripening

Local Number: GVIT 1514
Date: 17 Sep 93
Site: 31 Plantnum: 03
Species: Vitis amurensis
Fruitsize: 1.0 cm
Fruitshape: two inch cluster, twenty berries per cluster
Fruitcolor: black with white seeds
Taste: acidic
Other: clear, not dark juice

Local Number: GVIT 1515
Date: 17 Sep 93
Site: 31 Plantnum: 04
Species: Vitis riparia
Fruitsize: .7 cm
Fruitshape: two inch cluster, fifteen berries per cluster
Fruitcolor: black
Taste: acidic
Other: dark juice

Local Number: GVIT 1516
Date: 17 Sep 93
Site: 31 Plantnum: 05
Species: Vitis riparia
Fruitsize: 1.0 cm
Fruitshape: two inch cluster, tight, compact
Fruitcolor: black
Taste: acidic
Other: dark juice

Local Number: GMAL 3562
Date: 17 Sep 93
Site: 31 Plantnum: 06
Species: Malus kirghisorum
Fruitsize:
Fruitshape: long pedicle
Fruitcolor: greenish-yellow, orange-pink blush
Taste: sweet, little acid
Other: seeds, resistant to frost and winter dryness (form, Ketmen Dessert)

Local Number: GMAL 3563
Date: 17 Sep 93
Site: 31 Plantnum: 07
Species: Malus sieversii'niedzwetzkyana
Fruitsize:
Fruitshape: large, ribbed calyx
Fruitcolor: bright crimson
Taste: acidic-sweet with pleasan aroma
Prinsect: damaged by moth, less than domestica
Other: frost hardy and resistant to winter dryness, form #28

Local Number: GVIT 1517
Date: 17 Sep 93
Site: 31 Plantnum: 08
Species: Ampelopsis sp.
Fruitsize: .5 cm
Fruitshape: shouldered cluster, 10-15 berries
Fruitcolor: turquoise, white seed
Taste: bitter
Leafshape: riparia shaped leaf
Other:

Local Number: GMAL 3564
Date: 17 Sep 93
Site: 32 Plantnum: 01
Species: Malus sieversii
Height: 7 m
Habit: Golden Delicious habit
Branches: stripped by bear
Fruitsize: 4.3 x 4.6 cm
Fruitshape:
Fruitcolor: green with red blush
Taste: juicy, acidic, nice
Leafshape: like Red Delicious
Ledisease: scab; scorch
Other: gray necrotic leaf spots, East slope

Local Number: GMAL 3565
Date: 17 Sep 93
Site: 32 Plantnum: 02
Species: Malus sieversii
Height: 3 m
Fruitsize:
Fruitshape:
Fruitcolor: yellow-green
Taste: good
Ledisease: scab
Other: West slope

Local Number: GMAL 3566
Date: 17 Sep 93
Site: 32 Plantnum: 03
Species: Malus sieversii
Height: 10 m
Habit: Golden Delicious habit
Fruitsize: 4.5 x 4.7 cm
Fruitshape: Red Delicious shape
Fruitcolor: Green-yellow with red blush
Taste: good balance of sweet and acid
Ledisease: scab
Other: excellent quality, fruit one of the best

Date: 17 Sep 93
Site: 33 Plantnum: 01
Species: Malus sieversii
Fruitsize:
Fruitshape:
Other: cuttings; Form 35

Date: 17 Sep 93
Site: 34 Plantnum: 01
Species: Malus kirghisorum
Fruitsize:
Fruitshape:
Other: cuttings; Form 43

Date: 17 Sep 93
Site: 35 Plantnum: 01
Species: Malus hybrid
Fruitsize:
Fruitshape:
Other: cuttings; Form 181; M. sieversii x M. kirghisorum

Local Number: GMAL 3567
Date: 17 Sep 93
Site: 35 Plantnum: 03
Species: Malus sieversii
Height: 4.7 m
Fruitsize:
Fruitshape: roundish, oval
Fruitcolor: greenish yellow with little dark red stripes
Taste: acidic sweet
Ledisease: mildew and scab tolerance
Other: fruit mature in mid Sept, frost resistant and hardy to winter dryness, form 1037, seeds

Local Number: GMAL 3568
Site: 36 Plantnum: 01
Species: Malus sieversii
Fruitsize:
Fruitshape:
Other:

Local Number: GMAL 3569
Date: 19 Sep 93
Site: 36 Plantnum: 02
Species: Malus sieversii
Height: 10 m
Habit: spreading
Spur: spur type
Fruitsize: medium, 4.5 x 4.5 cm
Fruitshape: globose, elongated with long pedicel, ribbed fruit
Fruitcolor: yellow green with strip, some blush
Taste: aromatic, sweet, crisp, somewhat bitter, somewhat juicy
Other: 1685 m elevation

Local Number: GMAL 3570
Date: 19 Sep 93
Site: 36 Plantnum: 03
Species: Malus sieversii
Height: 8 - 9 m
Habit: erect
Spur: erect spurs
Fruitsize: small, 3.2 x 2.9 cm
Fruitshape: round flat, short pedicels, ribberd fruit
Fruitcolor: green, immature
Taste: acidic, hard
Frdisease: scab
Ledisease: scab
Other: just to the E of 36-02

Date: 20 Sep 93
Site: 37 Plantnum: 01
Species: Amygdalus spinosissima
Height: 1.5 m
Habit: spiny shrub
Fruitsize: 2 cm long, 1 cm wide
Fruitshape: small, dry seed
Leafshape: elongated, narrow
Other: near dry ravine, 25% E facing slope; 40-45 degrees celsius in the summer, -30 degrees celsius in the winter.

Date: 20 Sep 93
Site: 37 Plantnum: 02
Species: Spiriantus shrenkii
Fruitsize:
Fruitshape:
Other: dry, rocky S facing slope, 975 m; herbarium only

Date: 20 Sep 93
Site: 37 Plantnum: 03
Species: Cerasus tianschanica
Height: 0.5 m
Habit: low sprawling
Fruitsize: 1 cm diameter
Fruitshape: round
Fruitcolor: red at the end of June
Taste: very sweet
Other: rose-pink flowers in mid-May, 1.5 km NW of camp, 1020 m

Date: 20 Sep 93
Site: 37 Plantnum: 04
Species: Pistacia vera
Height: 1.5 m
Habit: spreading
Fruitsize:
Fruitshape:
Frinsect: worms
Ledisease: healthy
Other: 1050 m; 42 58.84 N, 69 52.68 E; herbarium only

Date: 20 Sep 93
Site: 37 Plantnum: 05
Species: Pyrus regelii
Height: 1.5 m
Fruitsize:
Fruitshape:
Fruitcolor: dried
Leafshape: dissected
Other: On plateau coming off N facing slope; herbarium only

Date: 20 Sep 93
Site: 37 Plantnum: 06
Species: Allium karatauensis
Height: 1 m
Fruitsize: inflorescence 3 cm
Fruitshape:
Other: poisonous, two large leaves at base, white flowers, N facing slope, 1060 m

Date: 20 Sep 93
Site: 37 Plantnum: 07
Species: Megacarpa orbiculata
Branches: multiple
Fruitsize: 1 cm diameter
Fruitshape: flat
Fruitcolor: orange brown, kidney shaped seed
Other: rocky soil, 1200 m; In Brassicaceae Family

Date: 20 Sep 93
Site: 37 Plantnum: 08
Species: Crataegus pontica
Height: 2.5 m
Fruitsize: 1 cm diameter
Fruitshape: flat, ribbed
Fruitcolor: yellow with red spots
Taste: good flavor
Ledisease: no scab or rust
Other: widely spaced trees, large population, dry soil, 1200 m, 3 -4 M. sieversii without fruit, 42 52.84 N, 69 52.10 E

Date: 20 Sep 93
Site: 37 Plantnum: 09
Species: Crataegus turkestanica
Height: 1.5 m
Habit: spreading, wider than high
Fruitsize: 0.5 cm diameter
Fruitshape: 1 carpel per fruit
Fruitcolor: red
Other:

Date: 20 Sep 93
Site: 37 Plantnum: 10
Species: Crataegus pontica
Height: 2 m
Habit: higher than wide
Fruitsize: 2 cm, 2 - 3 carpels per fruit
Fruitshape: flat, round, ribbed
Fruitcolor: yellow with red flecks
Taste: good flavor
Other: volcanic soil, 1200 m, area not grazed by domesticated animals

Date: 21 Sep 93
Site: 38 Plantnum: 01
Species: Amygdalus petunickovii
Height: 0.5 m
Habit: sprawling
Fruitsize:
Fruitshape:
Other: fruit from several plants collected

Local Number: GVIT 1518
Date: 21 Sep 93
Site: 38 Plantnum: 02
Species: Vitis vinifera
Height: 4 m
Habit: climbing in Crataegus
Fruitsize: 1 cm diameter, 30 berries per cluster
Fruitshape: round
Fruitcolor: black, clear juice
Taste: very sweet
Frdisease: leaf roll?, likely is natural coloration
Other: dry, rocky soil, 1 km NE of campsite, 925 m; High heat units, 40-45 deg. C, -30 deg C in winter

Local Number: GVIT 1519
Date: 21 Sep 93
Site: 38 Plantnum: 03
Species: Vitis vinifera
Height: 4 m
Habit: climbing
Fruitsize: 1.0 - 1.25 cm diam, 30 berries per cluster
Fruitshape: round
Fruitcolor: black, clear juice
Taste: sweet. excellent taste and blend of acid, skin tough
Other: 910 m; 42 53.12 N, 69 54.78 E; excellent for table grape

Local Number: GVIT 1520
Date: 21 Sep 93
Site: 38 Plantnum: 04
Species: Vitis vinifera
Height: 4 m
Habit: climbing Crataegus turkestanica
Fruitsize:
Fruitshape:
Fruitcolor: red , unripe?
Taste: juicy, not sweet
Other: sandy soil, 20 ft from stream, close to 38-03

Local Number: GVIT 1521
Date: 21 Sep 93
Site: 38 Plantnum: 05
Species: Vitis vinifera
Height: 8 m
Habit: climbing on Crataegus turkestanica
Branches: many old branches
Fruitsize: 1 cm diameter, 50 berries per cluster
Fruitshape: round
Fruitcolor: white or amber
Taste: very sweet, probably overmature
Other: 100 m from 38-04, rocky sandy soil, SE facing slope, Rubus, Sophora

Local Number: GVIT 1522
Date: 21 Sep 93
Site: 38 Plantnum: 06
Species: Vitis vinifera
Fruitsize: 1 cm diameter, 80 berries per cluster
Fruitshape: Cluster, 1 foot long
Fruitcolor: red
Taste: sweet
Leafshape: more lobed than white form
Other: next to 38-05

Local Number: GVIT 1523
Date: 21 Sep 93
Site: 38 Plantnum: 07
Species: Vitis vinifera
Height: 6 m
Habit: climbing on Crataegus
Fruitsize: 0.5 cm diameter, tight small cluster
Fruitshape:
Fruitcolor: black
Frdisease: mildew
Other: SE facing slope, 42 53.14 N, 69 55.08 E

Date: 21 Sep 93
Site: 38 Plantnum: 08
Species: Crataegus songorica
Height: 5 m
Fruitsize:
Fruitshape:
Other:

Local Number: GVIT 1524
Date: 21 Sep 93
Site: 38 Plantnum: 09
Species: Vitis vinifera
Habit: climbing on Celtis caucasica
Fruitsize: 1 cm diameter, medium cluster
Fruitshape: oval?
Fruitcolor: black
Taste: good flavor, crisp
Frdisease: mildew
Other: 10 m from 38-07, 40 m from stream up along NW facing cliff, 930 m

Local Number: GVIT 1533
Date: 21 Sep 93
Site: 38 Plantnum: 10
Species: Vitis vinifera
Habit: low sprawling bush
Fruitsize: 5 inch cluster, very loose, 40 -50 berries per cluster
Fruitshape:
Fruitcolor: black
Taste: good flavor, crisp, tender skin
Other: rocky slope, SE exposure, Cerasus

Local Number: GVIT 1525
Date: 21 Sep 93
Site: 38 Plantnum: 11
Species: Vitis vinifera
Height: 6 m
Habit: climbing
Fruitsize: large, 8 inch clusters
Fruitshape:
Fruitcolor: black
Taste: acidic, good flavor, somewhat crisp
Leafshape: large
Ledisease: clean, disease free
Other:

Date: 21 Sep 93
Site: 38 Plantnum: 12
Species: Padus mahaleb
Height: 3 m
Fruitsize: dried
Fruitshape:
Other: E facing slope at edge of small creek. Salvia, Aquilleja

Local Number: GVIT 1526
Date: 21 Sep 93
Site: 39 Plantnum: 01
Species: Vitis vinifera
Height: 5 m
Habit: climbing on Crataegus
Fruitsize: very tight cluster
Fruitshape:
Fruitcolor: black
Taste: sweet, edible skins, watery, not firm
Ledisease: purple; looks like leaf roll
Other: rocky sandy soil

Local Number: GVIT 1527
Date: 21 Sep 93
Site: 39 Plantnum: 02
Species: Vitis vinifera
Height: 5 m
Habit: climbing on Celtis caucasica
Fruitsize: 1 cm diameter, loose 6 inch cluster, nice cluster size
Fruitshape:
Fruitcolor: red
Taste: acid, good flavor, watery
Other: up hill on steep SW facing slope, loose rocky soil

Local Number: GVIT 1528
Date: 21 Sep 93
Site: 39 Plantnum: 03
Species: Vitis vinifera
Fruitsize: 0.5 - 0.75 cm diameter, straggly clusters
Fruitshape:
Fruitcolor: black
Taste: mild, sweet, not much acid
Frdisease: mildew
Other: maybe a mixture of two vines, across from 39-02, SW facing slope, Rhamnus

Local Number: GVIT 1534
Date: 21 Sep 93
Site: 39 Plantnum: 04
Species: Vitis vinifera
Height: 6 m
Habit: climbing on Crataegus
Fruitsize: large
Fruitshape:
Fruitcolor: black
Taste: very sweet, acidic
Other: 100 m from 39-03, close to stream. Astragalus neolypsianus

Local Number: GVIT 1529
Date: 21 Sep 93
Site: 39 Plantnum: 05
Species: Vitis vinifera
Habit: climbing on Crataegus
Fruitsize: small, 0.5 - 1 cm diameter, long uneven clusters
Fruitshape:
Fruitcolor: white
Taste: good flavor, watery
Leafshape: large
Other: 300 m from 39-04 at stream edge, 1.5 m above stream on 2nd tier of plateau

Date: 21 Sep 93
Site: 39 Plantnum: 06
Species: Allium longicuspis
Height: < 1 m
Fruitsize:
Fruitshape:
Other: seed and bulblets from mixed population

Date: 21 Sep 93
Site: 39 Plantnum: 07
Species: Daucus carota
Height: 1.5 m
Fruitsize: 3 inch diameter dried inflorescence
Fruitshape:
Other: seed from mixed population

Local Number: GVIT 1530
Date: 21 Sep 93
Site: 39 Plantnum: 08
Species: Vitis vinifera
Height: 3 m
Habit: climbing on Crataegus pontica
Fruitsize: 1 cm diameter, large shouldered cluster, 150 berries per cluster, 1 ft long
Fruitshape:
Fruitcolor: red, pinkish, some immaturity
Taste: sour
Other: sandy soil with some rocks, flat area, 25 ft from stream

Local Number: GVIT 1531
Date: 21 Sep 93
Site: 39 Plantnum: 09
Species: Vitis vinifera
Habit: climbing on Crataegus
Fruitsize: long loose clusters
Fruitshape:
Fruitcolor: red
Other: 10 m from 39-09, near stream, Fraxinus

Local Number: GMAL 3571
Date: 21 Sep 93
Site: 39 Plantnum: 11
Species: Malus sieversii
Height: 12 m
Habit: spreading
Fruitsize: mummified, picked up from ground
Fruitshape:
Other: old tree, open area, dry sandy soil, 40 m from stream, Fraxinus, Crataegus, Morus

Date: 21 Sep 93
Site: 39 Plantnum: 12
Species: Allium drobovlii
Fruitsize:
Fruitshape:
Other: seed from two small dried spikes

Local Number: GVIT 1532
Date: 21 Sep 93
Site: 40 Plantnum: 01
Species: Vitis vinifera
Fruitsize: 0.8 cm diameter, scraggly cluster, 25 berries per cluster
Fruitshape:
Fruitcolor: black
Taste: sweet, good flavor
Other: S most point of trip, Eleagnus

Date: 21 Sep 93
Site: 41 Plantnum: 01
Species: Pistacia vera
Fruitsize:
Fruitshape:
Other: middle ripening form,150 years old

Date: 21 Sep 93
Site: 41 Plantnum: 02
Species: Pistacia vera
Fruitsize:
Fruitshape:
Other: early ripening form, 180 years old

Date: 21 Sep 93
Site: 41 Plantnum: 03
Species: Pistacia vera
Fruitsize:
Fruitshape:
Other: late ripening form, 250 years old; no seed collected

Local Number: GMAL 3572
Date: 21 Sep 93
Site: 41 Plantnum: 04
Species: Malus sieversii
Fruitsize:
Fruitshape: long pedicels
Fruitcolor: yellow
Other: early maturing

Local Number: GMAL 3573
Date: 21 Sep 93
Site: 41 Plantnum: 05
Species: Malus kirghisorum
Fruitsize: large
Fruitshape:
Fruitcolor: yellow
Other:

Date: 21 Sep 93
Site: 41 Plantnum: 06
Species: Crataegus pontica
Fruitsize:
Fruitshape:
Other:

Date: 21 Sep 93
Site: 41 Plantnum: 07
Species: Crataegus songoricum
Fruitsize:
Fruitshape:
Other:

Date: 21 Sep 93
Site: 41 Plantnum: 08
Species: Celtis caucasica
Fruitsize:
Fruitshape:
Other:

Local Number: GMAL 3574
Date: 22 Sep 93
Site: 42 Plantnum: 01
Species: Malus kirghisorum
Height: 8 m
Habit: spreading. thin tree
Fruitsize: 3.5 x 3.5 cm
Fruitshape: oblong, deep pedicel cavity, medium pedicel
Fruitcolor: yellow with red blush, red around pedicel if ripe
Taste: bland, sweetish
Frdisease: scab
Other: gentle W facing slope, 41 23.44 N, 73 06.34 E

Local Number: GMAL 3575
Date: 22 Sep 93
Site: 42 Plantnum: 02
Species: Malus kirghisorum
Height: 10 m
Habit: spreading
Fruitsize: large, 4.6 x 4.0 cm
Fruitshape: long pedicel, indented at base of pedicel, round flat fruit, wrinkled calyx cavity
Fruitcolor: greenish yellow, matures to yellow, waxy
Taste: sweet, good flavor
Frdisease: scab
Leafshape: large long
Other: oxidizes quickly

Local Number: GMAL 3576
Date: 22 Sep 93
Site: 42 Plantnum: 03
Species: Malus kirghisorum
Height: 10 m
Habit: spreading
Fruitsize: small,
Fruitshape: crinkled calyx cavity, long pedicels
Fruitcolor: green
Taste: aromatic, sweet covering acidity
Frdisease: scab
Leafshape: round
Ledisease: scab
Other: 3 m from 42-02, down SE facing slope, 2% S slope

Local Number: GMAL 3577
Date: 22 Sep 93
Site: 42 Plantnum: 04
Species: Malus kirghisorum
Height: 12 m
Habit: large tree
Fruitsize: small
Fruitshape: indent by pedicel, wide calyx cavity, wrinkled calyx end, short pedicel
Fruitcolor: yellow, white flesh, russet
Taste: overripe
Leafshape: long, narrow, elongated, long petiole
Other: 30 m N of 42-03 uphill

Local Number: GMAL 3578
Date: 22 Sep 93
Site: 42 Plantnum: 05
Species: Malus kirghisorum
Height: 10 - 12 m
Fruitsize: small, 2.5 x 2.0 cm
Fruitshape: round, medium pedicel, deep pedicel cavity, wrinkled calyx end
Fruitcolor: yellow orange, russet
Taste: sweet, juicy
Frdisease: scab ++
Leafshape: elongated, long petiole
Other: old tree, at edge of E facing slope, Acer, Berberis, Juglans

Local Number: GMAL 3579
Date: 22 Sep 93
Site: 42 Plantnum: 06
Species: Malus kirghisorum
Height: 8 - 10 m
Fruitsize: large, 4.0 x 4.0 cm
Fruitshape:
Fruitcolor: yellow, waxy
Taste: overripe
Leafshape: wide
Other: On W facing slope, opposite side of canyon from 42-06

Local Number: GMAL 3580
Date: 23 Sep 93
Site: 43 Plantnum: 01
Species: Malus kirghisorum
Fruitsize: small, 3.0 x 3.0 cm
Fruitshape: oblong
Fruitcolor: red blush with yellow background
Taste: overmature
Frdisease: scab +
Leafshape: ?
Other: collected by crew at Sanatarium in Kyrgystan

Local Number: GMAL 3581
Date: 23 Sep 93
Site: 44 Plantnum: 01
Species: Malus kirghisorum
Height: 10 - 12 m
Habit: spreading
Fruitsize: small, 3.5 x 2.5 cm
Fruitshape: round, short pedicel, wide calyx cavity
Fruitcolor: red stripes
Taste: sweet, aromatic, somewhat bitter
Frdisease: scab
Leafshape: smallish
Ledisease: scab
Other: mixed population, 5 trees in cluster, 10% S facing slope, grazed site

Local Number: GMAL 3582
Date: 23 Sep 93
Site: 44 Plantnum: 02
Species: Malus kirghisorum
Fruitsize: medium, 4.0 x 4.5 cm
Fruitshape: elongated, wide calyx cavity
Fruitcolor: green with orange blush, very yellow flesh, russet
Taste: sweet, bitter
Frdisease: scab ++
Other:

Local Number: GMAL 3583
Date: 23 Sep 93
Site: 44 Plantnum: 03
Species: Malus kirghisorum
Fruitsize: medium, 3.0 x 3.5 cm
Fruitshape: round, flat, medium pedicel; flat, wide cavity
Fruitcolor: yellow, half covered with red blush, russet
Taste: sweet, somewhat aromatic, crisp texture
Frdisease: scab
Other: attractive, mixed with 44-02

Local Number: GMAL 3584
Date: 23 Sep 93
Site: 44 Plantnum: 04
Species: Malus kirghisorum
Fruitsize: small
Fruitshape: cherry-like, no calyx cavity
Fruitcolor: yellow
Taste: acidic
Frdisease: scab
Other:

Date: 23 Sep 93
Site: 44 Plantnum: 05
Species: Juglans regelii
Height: 4 m
Habit: dwarf rootstock
Fruitsize: usually 20 fruit per inflorescence
Fruitshape:
Other: early ripening, 11 years old, severe growing conditions

Date: 23 Sep 93
Site: 45 Plantnum: 01
Species: Malus kirghisorum
Fruitsize: small
Fruitshape: round, no calyx cavity, medium pedicel
Fruitcolor: green yellow with pink blush
Taste: acidic, very hard, immature
Other:

Date: 23 Sep 93
Site: 45 Plantnum: 02
Species: Pyrus regelii
Fruitsize:
Fruitshape: flat
Fruitcolor: green
Taste: acidic, bad flavor
Other:

Date: 23 Sep 93
Site: 46 Plantnum: 01
Species: Pyrus regelii
Height: 12 m
Habit: upright
Fruitsize:
Fruitshape:
Leafshape: fall coloration
Other: 1550 m

Date: 23 Sep 93
Site: 46 Plantnum: 02
Species: Pyrus regelii
Fruitsize: small
Fruitshape: oblong, prominent calyx
Fruitcolor: yellow, overmature
Taste: very astringent
Other:

Date: 23 Sep 93
Site: 47 Plantnum: 01
Species: Pyrus regelii
Height: 10 - 12 m
Habit: very erect
Spur: spur type
Fruitsize:
Fruitshape:
Other: rootstock potential, seed to D. Noiton

Date: 23 Sep 93
Site: 47 Plantnum: 02
Species: Pyrus regelii
Height: 10 - 12 m
Habit: very erect
Spur: spur type
Fruitsize:
Fruitshape:
Other: cuttings for rootstock, same as 47-01

Local Number: GVIT 1504
Date: 25 Sep 93
Site: 48 Plantnum: 01
Species: Vitis vinifera 'Tavria'
Fruitsize: 20 mm x 17 mm
Fruitshape: oval
Fruitcolor: black
Taste: crunch with muscat aroma, Table grape
Other: 1957, Inst. Magarach; InsEarly Kibraisky x Koroleva vinogradnikov (Queen of Grapes); average growth; tolerant to frost;

Local Number: GVIT 1505
Date: 25 Sep 93
Site: 48 Plantnum: 02
Species: Vitis vinifera 'Moldova'
Height: high
Fruitsize: large 24-27 mm x 19-20 mm; bunch is ave-large, 320 grams
Fruitshape: oval
Fruitcolor: dark violet with dense wax
Taste: pulpy and crunch; usual
Other: 1961. Moldova; Tuzal Kara x Seyve Villard 12375; table, late ripening; Tolerant to frost; very transportable; productive

Local Number: GVIT 1506
Date: 25 Sep 93
Site: 48 Plantnum: 03
Species: Vitis vinifera 'Murometz'
Fruitsize: 24-25 mm x 20.6 mm; bunch is large, conic, compactness is ave.
Fruitshape: a little bit oval
Fruitcolor: dark violet with dense wax
Taste: flesh is pulpy and crunch; taste is average
Ledisease: susceptible to oidium
Other: 1962, Inst. named after Michurin Severny (Seedling Melengrax V. amurensis) x Pobeda (Zabalkansky x Muskat hamburgsky); table;

Local Number: GVIT 1507
Date: 25 Sep 93
Site: 48 Plantnum: 04
Species: Vitis vinifera 'Rcatsitelly'
Fruitsize: large; bunch is average or large cylindrical to conic
Fruitshape: oval
Fruitcolor: greenish-yellow
Other: Georgian variety, wine, late ripening; used to preparing of dry and desert wines

Local Number: GVIT 1508
Date: 25 Sep 93
Site: 48 Plantnum: 05
Species: Vitis vinifera 'Taify Pink' or 'Taify rozovy'
Branches: well developed, lateral
Fruitsize: Bunch is large, weight is 5-6 kilograms; berry is large
Fruitshape: Bunch is wide conic; berry is oblong, oval with flat tip
Fruitcolor: pink and greenish yellow on shady side
Taste: flesh is densy and crunch
Other: Late ripening; table variety of Central Asia.; tolerance to frost is low; high transportability

Local Number: GVIT 1509
Date: 25 Sep 93
Site: 48 Plantnum: 06
Species: Vitis vinifera 'Kara-Uzum ashchadbudsky'
Fruitsize: Bunch is ave.-large, 14-23 gm; berry is ave.-large; pedicle is thick
Fruitshape: bunch is cylindrical to conic, dense; berry is round
Fruitcolor: dark red
Taste: flesh is pulpy and juicy
Other: Turkhmenian wine & table, late ripening; used for high quality deserts, strong & sweet wines; long storage; high transport

Local Number: GVIT 1510
Date: 25 Sep 93
Site: 48 Plantnum: 07
Species: Vitis vinifera 'Strashensky'
Fruitsize: Bunch is very large, 800 g; berry is very large
Fruitshape: bunch is cylindrical; berry is round
Fruitcolor: dark violet with dense wax
Taste: flesh is pulpy and juicy
Other: 1961, Moldova; Seyanets Drugba (Katta-Kurgan x Dodreliabi) x Muskat de Saint Valie; Table; tolerant to phyloxera & oidium

Local Number: GVIT 1511
Date: 25 Sep 93
Site: 48 Plantnum: 08
Species: Vitis vinifera 'Vierul-59'
Fruitsize: Bunch is large (20-25 cm); berry is large (24-35 mm x 20-25 mm)
Fruitshape: Bunch is conic; berry is oblong; Pedicle is dense
Fruitcolor: dark red to black
Taste: usual; flesh is crunch
Other: Moldova; Moldavsky x Pierrel; Tolerant to frost (-25 C) and fungi and phyloxera; long storage; high transportable, Table

Local Number: GVIT 1512
Date: 25 Sep 93
Site: 48 Plantnum: 09
Species: Vitis vinifera 'Jubilee of Crane'
Fruitsize: cluster large (20 cm x 12 cm); berry is large, firmly attached to pedicle
Fruitshape: cluster cylindrical conic and crumbly; berry roundish, pedicle is dense
Fruitcolor: beautiful dark red
Taste: flesh is pulpy and juicy
Ledisease: tolerant to diseases and phyloxera
Other: 1963, Moldova; Seedling VII-12-2 (Nimrano x Karmanny) x Muskat de Saint Vats; table; tolerant to frost (-27 C); long storage;

Local Number: GVIT 1513
Date: 25 Sep 93
Site: 48 Plantnum: 10
Species: Vitis vinifera 'Muskat Amber'
Fruitsize:
Fruitshape: berry is round or oval; bunch is cylindrical conic
Taste: Muskat aroma
Other: 1952; Table, early ripening; high transportable

APPENDIX 10

MALUS

SITE	SPECIES	# OF SEEDS	SITE	SPECIES	# OF SEEDS
01-01	M. sieversii	135	30-02	M. sieversii	225
02-01	M. sieversii	200	30-03	M. sieversii	225
03-01	M. sieversii	425			
			31-02	Ketman Dessert (cuttings)	
04-01	M. sieversii	225	31-06	Ketman Dess. (seeds)	700
04-02	M. sieversii	600	31-07	M. niedzwetzkyana (28)	1200
05-01	M. sieversii	150			
06-01	M. sieversii	300			
07-01	M. sieversii	475	32-01	M. sieversii	100
			32-02	M. sieversii	35
08-01	M. baccata	300	32-03	M. sieversii	500
			33-01	Form 35 (cutting)	
09-01	M. sieversii	350	33-02	Form 35 (seeds)	
09-02	M. sieversii	132	34-01	Form 43 (cutting)	
09-03	M. sieversii	300	34-02	Form 43 (seeds)	
10-01	M. sieversii	350	35-01	Form 181 (cutting)	
11-01	M. sieversii	200	35-02	Form 181 (seeds)	
12-01	M. sieversii	250	35-03	Form 1037 (seeds)	1200
12-02	M. sieversii	300			
12-03	M. sieversii	55	36-01	M. sieversii	130
12-04	M. sieversii	255	36-02	M. sieversii	325
13-01	M. sieversii	200	36-03	M. sieversii	250
14-01	M. kirghisorum	200	39-11	M. sieversii	175
14-02	M. sieversii	300	41-04	M. sieversii	63
15-01	M. sieversii	225	41-05	M. kirghisorum	50
16-01	M. sieversii	200			
17-01	M. sieversii	125	42-01	M. kirghisorum	400
18-01	M. sieversii	275	42-02	M. kirghisorum	550
19-01	M. kirghisorum	200	42-03	M. kirghisorum	500
19-02	M. kirghisorum	225	42-04	M. kirghisorum	350
			42-05	M. kirghisorum	850
21-01	M. sieversii (cuttings)		42-06	M. kirghisorum	125
23-01	M. Sieversii (seed)	160			
24-01	M. sieversii	300	43-01	M. kirghisorum	200
24-02	M. sieversii	225	44-01	M. kirghisorum mixed population	550
25-01	M. sieversii	105	44-02	M. kirghisorum	48
26-01	M. sieversii	250	44-03	M. kirghisorum	90
27-01	M. sieversii	325	44-04	M. kirghisorum	25
30-01	M. sieversii	300	45-01	M. kirghisorum	450

APPENDIX 11

OTHER SPECIES

SITE	SPECIES	# OF SEEDS
37-06	Allium sp.	265
39-06	Allium sp.	250
39-12	Allium sp.	25
37-01	Amygdalus sp.	100
38-01	Amygdalus sp.	26
37-07	Brassica sp.	12
41-08	Celtus sp.	200
37-03	Cerasus sp.	40
07-02	Crataegus sp.	125
25-02	Crataegus sp.	
31-01	Crataegus sp.	160
37-08	Crataegus sp.	225
37-09	Crataegus sp.	150
37-10	Crataegus sp.	120
38-08	Crataegus sp.	30
41-06	Crataegus sp.	55
41-07	Crataegus sp.	48
39-07	Daucus sp.	1200

SITE	SPECIES	# OF SEEDS
05-02	Humulus sp.	150
12-05	Humulus sp.	150
44-05	Juglans sp.	5
38-12	Padus sp.	85
41-01	Pistachio sp.	375
41-02	Pistachio sp.	105
41-09	Pyrus sp.	150
46-01	Pyrus sp.	75
46-02	Pyrus sp.	500
47-01	Pyrus sp.	D.N.
47-02	Pyrus sp.	cutting
45-02	Pyrus sp.	350
22-01	Ribes sp.	200
25-03	Ribes sp.	200
28-01	Ribes sp.	900
29-01	Rubus sp.	125
20-01	Sorbus sp.	550

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31-08	Ampelopsis sp.	275
31-03	V. amurensis	350
31-04	Vitis sp.	85
31-05	Vitis sp.	18
38-02	V. vinifera	200
38-03	V. vinifera	500
38-04	V. vinifera	275
38-05	V. vinifera	225
38-06	V. Vinifera	425
38-07	V. vinifera	325
38-10	V. vinifera	800
38-11	V. vinifera	325
39-01	V. vinifera	750
39-02	V. vinifera	400
39-03	V. vinifera	550
39-04	V. vinifera	325
39-05	V. vinifera	700
39-08	V. vinifera	700
39-09	V. vinifera	600
40-01	V. vinifera	400

48-(1-10) - 10 accession cuttings

APPENDIX 12

SUMMARY OF COLLECTIONS

SPECIES FORM	# OF ACCESSIONS	# SEED/CUTTING
Malus seed	60	18,000
Malus scion	5	15 (cuttings)
Vitis seed	21	8700
Vitis cutting	10	10 x 6 (60 cuttings)
Ribes seed	3	1300
Rubus seed	1	125
Sorbus seed	1	550
Crataegus seed	8	950
Amygdalus seed	2	126
Prunus cerasus seed	1	40
Pistachio seed	2	480
Celtus seed	1	200
Juglans seed	1	5
Prunus Padus seed	1	85
Allium seed	3	540
Brassica seed	1	12
Daucus seed	1	1200
Humulus seed	2	300
Pyrus seed	4	1075
Pyrus scion	1	3 (cuttings)
	129 Accessions	33,000 seeds