PLANT GERMPLASM COLLECTION REPORT
USDA-ARS
FORAGE AND RANGE RESEARCH LABORATORY
LOGAN, UTAH
Foreign Travel to:
USSR (North Caucasus, Kazakhstan Republic)
July 18-August 31, 1977
U.S. Participants

Douglas R. Dewey - Research Geneticist (deceased) contact Jack Staub
USDA-Agricultural Research Service
Logan, Utah U.S.A.
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GERMPLASM ACCESSIONS

Country Visited:

Soviet Union
-North Caucasus
(Stavropol Kray)
-Kazakstan Republic
(Tselinograd Oblast)
(Alma Ata Oblast)
(Dzhambul Oblast)
(Chimkent Oblast)

Period of Travel:

July 18 - August 31, 1977

Moscow:	July 18-19
Stavropol:	July 20 - August 6
Tselinograd:	August 7-11
Alma Ata:	August 12-16
Dzhambul:	August 17-21
Chimkent:	August 22-28
Moscow:	August 29-31

Purpose of Trip: 1) To collect germplasm of grasses, legumes, forbs, and shrubs from natural large sites in the USSR for possible use on U.S. rangelands; 2) to establish contracts with Soviet botanists and plant breeders for the purpose of negotiating future seed exchanges.

SUMMARY

A 45-day plant collection expedition to the USSR by D. R. Dewey, A. P. Plummer, and Laurie Law netted about 1,100 seed collections of range-forage grasses, legumes, forbs, and shrubs. The Soviets provided land transportation and an escort of several scientists and administrators throughout the trip. The collectors were usually housed in hotels and made daily trips to collect native vegetation in surrounding areas usually within a 100-km radius.

Almost 3 weeks (July 20 - August 6) were spent in the Stavropol Kray in the northern foothills of the Caucasus Mountains. This area is moderately humid (400-1000 mm precipitation) and has a rich mixture of grasses and legumes. More than 600 collections were made. A large collection of Trifoliumambiguum was obtained from the Stavropol Botanical Garden. Significant collections were made in the wild of: Agropyron, Bromus, Festuca, Phleum, Lotus, Medicago, Trifolium, Vicia, and Onobrychis. Contacts made with the staff of the Stavropol Botanical Garden should permit future seed exchange with that institution.

On August 2, Mr. Plummer was hospitalized because of chest pains, and he stayed there until early September when he was able to return to the United States. Laurie Law remained with Plummer, and Dewey continued the expedition with a Soviet escort.

Five days (August 7-11) were spent collecting in the New Lands area near Tselinograd in northern Kazakstan, with the Shorthandy Grain Research Institute as the base of operations. This area is flat prairie land with severe winters and less than 300 mm precipitation. About 125 collections were made of Agropyron, Elymus, Bromus, Medicago and miscellaneous species. The possibility exists for seed exchange with grass and legume breeders at Shorthandy.

Another 5 days (August 17-21) were spent in the desert regions around Dzhambul in souther Kazakstan. This area is a true desert with 100 to 300 mm precipitation. About 100 collections were of crested wheatgrass (Agropyronsibiricum),which grew in sand dunes. Dzhambul was the only area where we located Elymus multicaulis, the Asian counterpart of North American Elymus triticoides.

The final week (August 22-28) was spent around Chimkent about 100 km west of Dzhambul. Almost 150 collections were made in this area. Good collections were made of Agropyron, Elymus, Bromus, and Dactylis. In all areas, seeds of desert shrubs were immature, so very few desert shrubs were collected during the trip.

The overall expedition could be described as being about 50% successful in terms of what we had hoped to accomplish. The following recommendations are made concerning future

expeditions and seed exchanges:

1) Continued exchange of plant-collecting teams between the USA and USSR is desirable and necessary. The USSR has the world's largest store of forage germplasm, and only a small part of the country has been adequately explored by plant collectors.

2) Expedition itineraries should be jointly developed by plant collectors in both countries, and wide flexibility should be allowed in timing and location.

3) Procedures for getting the seed out of the USSR need to be simplified. Quarantine inspections should be the responsibility of the receiving country. Collectors should have the option of hand-carrying the seed to Moscow.

4) Germplasm exchanges between individual scientists should be encourage and facilitated. However, all seed should be sent through appropriate offices at Leningrad and Beltsville.

TRAVEL DETAILS

July 14: Traveled from Logan, Utah, to Washington, D.C.

July 15: Attended a briefing at the US-USSR Secretariat office in Washington, D. C. In addition to Dewey, Plummer, and Law, the following individuals participated in the briefing; 1) C. F. Lewis, ARS-NPS Beltsville; 2) Howard Hyland, retired ARS Principal Plant Introduction Officer; 3) Irene Murray, US-USSR Secretariat interpreter; 4) Roger Euler, head of the US-USSR Secretariat; and 5) A Foreign Service officer.

July 16-18: Traveled from Washington D. C. To Moscow, with a 2 day layover in London.

July 19: Met with a delegation from the All-Union Academy of Agriculture and the USSR Ministry of Agriculture to discuss our itinerary. Those in attendance included:

1) Academician Anatoly Pukhalsky (Plant Production and Breeding). Dr. Pukhalsky appears to be a very influential person with overall responsibility for breeding and selection work in the USSR. The VIR Institute at Leningrad falls under his administrative jurisdiction. Dr. Pulkhalsky expressed a desire to strengthen between VIR and Beltsville with respect to germplasm exchange. We expressed our concern over the rigidity of the itinerary, and Dr. Pukhalsky assured us that it could be modified as needed.

2) V. Zvyagin - Deputy Chief of Foreign Relations. Department of the USSR Ministry of Agriculture. He did not enter into the discussions.

3) Mr. Vitali Inosemtzev - Candidate of Science (VIR). Mr. Inosemtzev is a young grass breeder (bromegrass) who was designated as our permanent escort for the entire expedition. He speaks English quite well and can serve as an interpreter if necessary.

4) Mr. Valdimir Sedunov - Coordinator of exchange teams between the US and USSR. Mr. Sedunov is fluent in English and handles the arraignments for visiting teams. Our visas did not included Tselinograd, and Mr. Sedunov arranged to have that stop added to the visas.

July 20: Traveled from Moscow to Stavropol (North Caucasus) and met with the following staff members of the Stavropol Agricultural Research Institute:

1) Alexander Kitayev - Deputy Director of the Research Institute. Mr. Kitayev is a friendly capable administrator, who had overall responsibility for us while in Stavropol.

2) Dr. Victor Kravtsov - Head of the Laboratory for Breeding Perennial Forage Grasses. Dr. Kravtsov accompanied us on a daily basis during our three week stay in Stavropol. We should maintain a correspondence contact with Dr. Kravtsov to negotiate future seed exchanges.

3) Dr. Evgeny Ryabov - Head of the Wind Erosion Laboratory. Dr. Ryabov has spent several months in the U.S. studying wind erosion in the Great Plains.

4) Mrs. Valentina Suborina - Interpreter.

The mailing address of the Institute is:

Stavropol Agricultural Research Institute
356200 Shpsketskoye Village
Stavropol Kray, USSR

The Research Institute was organized in 1966, and the facilities are new. However, the laboratories are modest and quite poorly equipped. The work we saw in the laboratory was routine. I was more impressed with the field work with cereals, particularly the Triticale plots. The experimental plots of cereals, corn, and sunflower were well cared for, and the Research Institute seems to be doing a good job of breeding cereals.

July 21-22: Met with the staff of the Stavropol Botanical Garden and collected in the Botanical Garden. The Garden is 17 years old and is an arm of the Agricultural Research Institute, although it is at a different location. The staff of the Botanical Garden with whom we worked included:

1) Dr. Vladimir V. Scripchinsky - Director of the Botanical Garden. Dr. Scripchinsky is a young man (in his 30's) trained in plant physiology. He was extremely accommodating and provided us access to all the facilities of the Botanical Garden. He provided one or more trained botanists to accompany us while collecting the Stavropol Kray. He has been the Director of 4 years.

2) Prof. Vasily V. Scripchensky - Retired Director of the Botanical Garden and father of the current Director. He is a very capable botanists-physiologist and accompanied us on most of our collecting trips.

3) Prof. Valdim G. Tanfielev- Retire botanist. Undoubtedly he is the most knowledgeable botanists that we met in the USSR. However, he is very old and cannot be expected to work much longer. He accompanied us almost daily to the field to and largely responsible for our itinerary in Stavropol Kray.

4) Mr. Dzhentimir Dzibov- Botanist. Mr. Dzibov shares his time between the Botanical Garden and the Research Institute. He accompanied us on all of our collecting trips at Stavropol. He volunteered to collect seed of Artemesia etc. later in the year, and he should prove to be a valuable contact for additional seed.

The mailing address of the Botanical Garden is:

Stavropol Botanical Garden
P.O. Box 22
Stavropol, 355000, USSR

We collected on the grounds of the Botanical Garden for 1 ½ days. The Garden occupies several hundred acres and contains native and introduced vegetation. Prof. Tanfielev has a forage garden consisting of grasses, legumes, forbs, and shrubs. We collected seed from much of the material. The Botanical Garden contains a large collection of Trifolium *ambiguum*, and Perry Plummer obtained seed of most collections. The staff also provided us with seed packets of other T. ambigumm collections, which was probably the most outstanding material from Stavropol.

Profs. Scripchinsky and Tanfielev have transplanted segments of virgin meadow and other typical vegetation from the surrounding areas to the Botanical Garden. They have been able to reproduce the native vegetation quite closely and we made a number of collections in it. These

collections were of no particular value because we were later able to collect directly on the native sites.

July 23-24: (Saturday and Sunday) - These are non-working days for the Soviets. We were taken for a guided tour of the city on Saturday and visited the Stavropol Museum on Sunday.

July 25: Collected on the meadow plateaus of Mt. Strizhame (800 m) about 40 km south of Stavropol. The plateau is covered with a rich mixture of grasses (Bromus ripariu, Festuca orientalis, F. gianteus, Phleum phleodies, Agropyron intermedium), legumes (Trifolim pratense, T. alpestre, T. ambiguum, Lotus caucasicus), and many flower and other forbs. No Medicago was found. The Agropyron species form a minor part of the vegetation. The Stavropol Kray is only on the perimeter of the A. intermedium distribution.

July 26: Collected on two sites located on the Sheep and Goat Institute farm about 50 km southeast of Stavropol. The first area (designated as Ravine 4, Division 5) was moderately dry steppe (500 mm precipitation) at an elevation of between 500 and 600 meters. This area had a rich mixture of legumes and grasses including: Bromus riparius, B. inermis, Festuca sulcata, Agropyron elongatiforme, A. intermedium, Vicia tenuifolia, Medicago romanica, Trifolium ambiguum, and Onobrychis inermis.

The second site (designated as Yankulskaya) was drier (400 mm precipitation) and the soil was a heavy, saline solonetz. The area was grazed moderately. The following grasses and desert shrubs predominated: Agropyron pectiniforme, A. elongatiforme, Stipa sp., Bothriochloa ischaemum, Medicago romanica, and Artemisia sp.

July 27: A nonproductive day because we were taken to a heavily grazed site on the Sheep and Goat Institute Farm.

July 28: Collected at three sites in the Beshpagir Hills (ca 400 m elev.) about 500 km east of Stavropol. The area is very sandy and subject to wind erosion. Bothriochola ischaemum is a predominant grass; however, considerable crested wheatgrass grows in this area. We made significant collections of Agropyron desertorum-sibiricum. There is a continuous spectrum of spike types from very narrow (A. sibiricum) to moderately broad (A. desertorum).

July 29: Collected on the "Victory" collective farm about 100 km east of Stavropol near Svetlograd. The collecting area was similar to the Beshpagir Hills. The farm, consisting of 14,000 ha, contains a few ungrazed or lightly grazed sandy hillsides (ca 250 meters) with precipitation between 400 and 500 mm. Bothriochloa ischaemum is the dominant grass. I made sizeable collections of Agropyron desertorum-sibiricum, some of which were growing in sand

dunes. I also collected Medicago cancellata. This was the only site where we were able to collect the latter species.

July 30: (Saturday) Collected for a half day at three sites on Mr. Nedramanya (500 m elev.) About 30 km south of Stavropol. This area is good for collecting: Medicago romaica, Lotus caucasicus, vicia tetrasperma, Onobrychis inermis, and Agropyron intermedium.

It rained much of the day, and our seed envelopes got wet and came unglued. In the future, care should be take to use envelopes with a water insoluble glue.

July 31: (Sunday) Attended a picnic given in our honor by the Agricultural Research Institute.

August 1: Collected on the "Lenin" collective farm about 90 km east of Stavropol and 14 km northwest of Svetlograd. Collecting was very poor because the area was heavily grazed. Bothriochola ischaemun was again the dominate grass. The Stavropol Kray is in the transition zone between "warm-season" and "cool-season"

species. This is not a very productive region for collecting Agropyron.

August 2: Perry Plummer was not feeling well, so he and Laurie Law stayed at the hotel. I collect in an area about 120 km east of Stavropol and 50 km southeast of Svetlograd. I made some good collections of crested wheatgrass, Agropyron desertorum, at the eastern entrance to the Yankulskaya Valley.

On our return to Stavropol in the evening, I found the Perry was in the hospital because of chest pain. The Soviet doctors thought he was on the verge of a heart attack and ordered him to bed for at least a week. He was confined to bed for more than a month, and his participation in the expedition ended as of August 2.

August 3: Several phone calls were made to our Embassy in Moscow concerning the future of the expedition.

August 4: Received word from the Embassy that Laurie Law should remain with Mr. Plummer in Stavropol and that I should continue the expedition with our Soviet escort, Mr. Vitali Inosemtsev. I was given authority to hire an interpreter, but I decided that Mr. Inosemtsev knew enough English to get us by.

August 5: Made preparations to leave for Moscow and then to Tselinograd in the New Lands area of Kazakstan. All of our collections to this point (D-1300 to 1725 and P-1 to 185) were turned over tot eh Stavropol Botanical Garden for quarantine inspection. I was permitted to carry one large box of seed and some living vegetative material with me to Moscow.

August 6: Traveled to Moscow (the plant was 6 hours late) and deposited the seed, living material, used collecting books, and excess clothing, etc. with Alan Trick, the Agricultural Attache at the U.S. Embassy. I left instructions with Mr. Trick to ship the live material out immediately and send the used collecting books via pouch mail. The seed was to be sent via the APO mail system. Unfortunately, none of the material was mailed, and all of it was still in the Embassy at the time of the Embassy fire, about 10 days later. Fortunately, the seed and collecting books were not destroyed in the fire; but my clothes and other personal effects were badly burned, and the vegetative material was destroyed (it probably had already died).

August 7: Traveled to Tselinograd, which is about 1,500 air miles from Moscow. Met with the following local agricultural officials who were responsible for us during our stay in the Tselinograd Oblast.

1) Valentin I. Baidin - Chief Agronomist for the Tselinograd district. Mr. Baidin was very useful in making our transportation arrangements (a bus), but he had little acquaintance with the native vegetation.

2) Ilya Kurilenko - Regional Agronomist for the Shorthandy district. Mr. Kurilenkowas knowledgeable in crop production practices, but knew little of the native vegetation.

Tselinograd is in the New Lands area of the USSR, which was broken out of naive prairie (primarily Festuca, Stipa, and Artemisia) and planted to wheat about 18 years ago. The wheat crop looked good and I estimated that it would average between 20 and 25 bushels/acre. Wheat extends to the horizon in many areas.

Most of the rangeland is heavily grazed and is in poor condition. Black alkali patches occur extensively, and salinity is a major problem. In some areas, large tracts of land have been seeded to crested wheatgrass. Some 2,500,000 acres have been seeded to crested wheatgrass in the Tselinograd Oblast.

The winters are severe, and the wind usually removes the snow cover. Plants from this part of the USSR should have good winter hardiness, drought tolerance, and salt tolerance.

August 8: Collected in the vicinity of Tselinograd and made some worthwhile collections of Agropyron cristatum, Elymus angustus, Elymus ramosus, Bromus inermis, and Medicago falcata. The Bromus inermis in this area is thought to be 2n=28, according to Mr. Inosemtzev.

August 9: Traveled by car form Tselinograd to Shorthandy about 60 km north of Tselinograd and then to a collective farm 40 km west of Shorthandy. Made collections of miscellaneous grasses, legumes, forbs, and shrubs. Early in the day we were joined by a plant quarantine officer who flew in from Alma Ata. His stated purpose was to help expedite the collecting and quarantine inspection, but his presence soon became intolerable. He insisted on examining every plant for disease before I could collect it. Needless to say, we soon had trouble. I expressed my dissatisfaction to the Soviet officials at Shorthandy, and they promised to get rid of the quarantine inspector. Their work was good, and I never saw the quarantine officer again.

We spent the night and the next two days at a guest house on the grounds of the Shorthandy All-Union Research Institute of Grain Farming. The Director of the Institute is Academician Alexander I. Barayev. Dr. Barayev is credited with making the New Lands project a success. Under his direction, 60,000,000 ha were taken out of native prairie and planted to wheat. The program faltered badly in the beginning because of wind erosion. However, their cropping practices have overcome the problem. From what I saw in the vicinity of Shorthandy, I must agree that the program has been highly successful. Dr. Barayev is an older man, with a pleasant manner and a rather broad knowledge of agriculture. I was impressed with him. Other members of the Shorthandy Staff that we dealt with over the next 2 days were:

1) Dr. Oleg S. Horikov - Deputy Director. Dr. Horikov was our official host and traveled with us during our stay at Shorthandy.

2) Dr. Elena V. Kolesnikova -Grass Breeder. Dr. Kolensikova is a middle-aged lady who has had some success as a plant breeder. She has released a variety of Elymus junceus, `Shorthandy' and is doing breeding work with Elymus angustus, Agropyron cristatum, and Bromus inermis. She is looking superficially at Elymus dahuricus, Hordeum violaceum (brevisubulatum), Kochia prostrate, Eurotia ceratoides, and Artemisia marshliana.

3) Dr. Ludmila I. Zagorodnai -Legume Breeder. Mrs. Zagorodnai seems to be doing about the same level of breeding as Mrs. Kolesnikova, which is simple selection.

4) Dr. Fedor Fedorovich Samosev - Forest Dendrologist. He maintains a dendro park on the station, and we collected a number of tree and shrub seeds from it.

The mailing address of the Shorthandy Institute is:

All Union Research Institute of Grain Farming
Tselinograd Oblast, Shorthandy 1, 474070, USSR

At Shorthandy, we were joined by Dr. A. I. Inanov, a forage specialist from Leningrad (VIR). Dr. Invanov was sent to join the expedition by Academician Budin (VIR) because of Perry Plummer's inability to continue the trip. Dr. Ivanov's presence was welcome. He is an alfalfa expert, and he will soon replace Dr. Lubnetz as the head of the VIR Forage Section.

August 10-11: Collected in the vicinity of the Shorthandy Institute. I made excellent collections of Elymus angustua near the Institute headquarters and also made a few collections of E. junceus. Seed was badly shattered on the E. junceus plants. Shorthandy is on the fringe of the E. junceus distribution, and this was the only location on the trip where we found this species.

We were taken to some virgin prairie near Shorthandy, but collecting was poor. The prairie is dominated by Festuca sulcata and Stipa capillata. There were virtually no shrubs on the virgin land, just a little Artemisia. Collections up to D-1843 were left at Shorthandy for quarantine inspection.

Because of our inability to collect significant amounts of Elymus junceus, I asked R. Horikov if we could have access to some of the breeding stocks of Dr. Kolesnikova. He declined the request, saying that we might be able to work out some kind of exchange in the future.

August 12: (Friday) Traveled form Tselinograd to Alma Ata. We were met by three junior officials of the Regional Department of Agriculture, who told us we should rest until Monday. I expressed my dissatisfaction with this plan so we were allowed to collect in a city park (Gorky) during the afternoon. I made some good collections of Dactylis glomerata.

August 13: (Saturday) Met with Mr. Gayoz F. Ismalov, Chief of the Ministry of Agriculture in Kazakstan. I expressed my concern over the reluctance of Soviet breeders to share seed with us and he indicated he would help with the problem, but I saw no effects in this offer. In the conversation with Mr. Ismalov, he pointed out the following facts about Kazakstan.

Total land area - 277,000,000 ha

Total range land- 180,000,000 ha

Deserts occupy half of the total land area. The Kazakstan Republic has 2,000 state farms and 400 collective farms. The average farm is about 40,000 ha and has 4,000 head of livestock. The Government is increasing support for reclamation of arid lands. Original vegetation consists of Stipa, Festuca, Koeleria, Artemisia, and Salsola. Species used in revegetation include:

1) Legumes - Medicago, Melilotus, and Onobrychis

2) Grasses - Agropyron cristatum, Elymus junceus

3) Shrubs - Kochia prostrata, Eurotia, and Atriplex

At this point, we were joined by Dr. E. L. Bekmakhamedev, who served as our host throughout the remainder of the expedition in Kazakstan. Dr. Bekmakhamedev is a grass breeder, and he had bred the variety `Bozoisky', which looks especially good at Logan.

August 15: Met with the following official of the Kazakstan Institute of Grassland Agriculture:

1) Zhapar A. Zhambakin - Director

2) Victor M. Marakov - Deputy Director for Breeding. Dr. Marakov seems to be a very capable man. He wants literature on alkali and leaf cutter bees. They would like to buy leaf cutter bees from the U.S.

3) Kamal B. Borahgaziev - Plant Introduction Officer. This man controls the exchange of seed with other institutions. I asked him to let us have seed of their breeding stocks of Elymus junceus, etc., but he politely put me off. It is important that we obtain his cooperation if we hope to get seed from this institute.

4) Erkin L. Bekmakhamedev - Grass Breeder. He was sympathetic to our request for seed, but he apparently does not have the authority to give us seed.

The address of the Institute is:

Kazakstan Institute of Grassland Agriculture

Dzhandosova Street, No. 51, Alam Ata, 480035, Kazakstan, USSR

The Kazakstan Institute of Grassland Agriculture was established in 1969 and has a staff of 250 (professional and nonprofessional). It is an expanding institute and will likely gain greater status than the breeding program at Shorthandy. The Breeding Center of the Institute seems to have rather large germplasm collections of : Elymus junceus, E. angustus, E. paboanus, E. gianteus, Festuca sulcata, Eurotia, Salsola rigida, Kochia prostrata, and Calligonum sp.

I promised to send them my reprints on Elymus and seed of our most promising amphiploid hybrids. In return, I think they will send me seed of Elymus et al.

August 16: Visited the Kazakstan Institute of Agricultural farming outside Alma Ata. This visit was a little value to me because the Institute does no breeding work. They are involved in cultural and management studies of a wide range of crops. The Institute has a cytology and genetics section where some work is being done on Triticum-Aegilops hybrids and male sterility in alfalfa. We spent most of the time in the forage section and obtained seed of several uncommon forage and miscellaneous crops, Baptisa australis, Siphium perfoliatum, Sida hermophrodila, Inula helenum, and Kiteibelia vitifolia. In return for the seed I am to send the following: 1) Seed and nitrogen-fixing bacteria of Cicer milk vetch to Mr. Aleksandra I. Scholar, and 2) Cytogenetic papers to Mr. Kozachemtov Kenebai.

The mailing address of the Institute is:

Kazakstan Institute of Agricultural Farming

Kasikelensky Region, Alma-Ata District, 483133 Kazakstan, USSR

I turned over a box of seed, with collections to D-1958, to the Regional Department of Agriculture for shipment to Moscow. Traveled from Alma Ata to Dahambul in the late afternoon.

August 17: Visited with the chief of the Dzhambul Regional Department of Agriculture and his staff.

1) Leonid P. Kapyurin - Chief

2) Ozgan T. Taukebaev - Deputy Chief - A man with oriental features, who traveled with us during our stay in Dzhambul. He is a very pleasant and cooperative man. I should probably work

through him in future efforts to obtain seed.

3) Yuri S. Elezarov - Geobotanist. A capable botanist, who traveled with us everyday in Dzhambul. He agreed to obtain seed of Eurotia, Kochia, and Artemisia for us.

4) Evgeny I. Zakharov - Administrative Officer, who worked out the details of our visit.

I have the address, but it is in Russian letters.

In the afternoon, we collected on the "Farm Worker" collective farm about 40 km northeast of Dzhambul. The most significant collection was Elymus multicaulis. This was the only area on the entire expedition where we found much E. multicaulis. It is the Asian counterpart of North American E. triticoides, and I think it is a useful species.

The range land around Dzhambul is heavily grazed and is in poor condition. Much of the land is infested with Gobelia and Alhagi. Artemisia is a major constituent of the range, but I did not see much Kochia.

August 18: Collected in the Moyun Kum Sand Desert northeast of Dzhambul. Our best collections were of Agropyron sibiricum, which grew in sand dunes. This form of crested wheatgrass has extremely narrow spikes, and I consider it to be the "true" A. sibiricum. We also made several collections of a large desert shrub, Calligonum sp. The local people consider it to be a valuable forage species.

August 19: Collected in the low mountains southeast of Dzhambul on the "October" collective farm. All lands were heavily grazed, and collecting was very poor.

August 20: (Saturday) Returned to the Moyun Kum sand desert and collected in a rainstorm. I got sick to my stomach (the only time on the expedition and had to return to the hotel early.

August 21: (Sunday) collected along the margin of Lake Komenhoye southwest of Dzhambul. Collecting was very poor, so most of the time was spent fishing for carp, etc.

Prepared a box of seed, with collections to D-2074, for shipment to Moscow. The seed was turned over to the Regional Department of Agriculture for quarantine inspection.

August 22: Traveled by car from Dzhambul to Chimkent, and I collected en route. The most useful collections were of Agropyron intermedium which is one of the predominant grasses in the area. The pubescent form (A. trichophorum) was much more abundant than the glabrous form. This lends some support tot eh contention that the two forms are ecologically different. Previous to this, I had felt that glabrous and pubescent forms were equally adapted to all site. Now I am not so sure.

In the afternoon, we called on the Chief of the Chimkent Regional Department of Agriculture and his staff:

1) Adil S. Sasboukayev - Chief

2) Ilgiz A. Khasanov - A deputy chief, who served as our host. He is an economist and know little about the vegetation.

3) Bolat A. Datkeyev - Administrative Assistant

4) Mrs. Nadezda N. Mesherikova - Botanist. Mrs. Mesherikova is a capable hard-working botanist who helped with the collecting in Chimkent. She was the most helpful and capable person we encountered in Chimkent.

I have the Chimkent Regional Department of Agriculture address in Russian.

Visited the Chimkent Institute for Breeding Kara-Kul sheep. The visit was of some interest but of no value as far as germplasm collecting is concerned.

August 23: Collected in the vicinity of Chimkent. Most of the land is badly overgrazed and collecting was meager. Chimkent is in the transition zone between cool-season and warm-season grasses. Stands of Brothriochloa ischaemum are often mixed with Agropyron intermedium (trichophorum).

August 24: Moved to a guest house on the "Michurin" collective farm, about 75 km east of Dzhambul. This location served as our base of operations for the next 3 days. The president of the nearby "Victory" collective farm served as our host and traveled with us each day. Collected in the vicinity of the "Victory" collective farm and made good collections of Agropyron intermedium (trichophorum), Dactylis glomerate, Bromus inermis, and Hordeum bulbosum.

August 25: Collected on a hunting preserve in the low mountains about 45 km northwest of the guest house. Grazing is prohibited here and collecting was quite good for Agropyron cristatum (possible 2n=42), a fine stemmed shrub, Origanum vulgare, which may have value as a conservation plant.

August 26: Collected in a mountainous area about 25 km southeast of the guest house and made good collections of Agropyron cristatum, A. intermedium, and Dactylis glomerata. I encountered an interesting Elymus species that I could not identify. It is a bunchgrass with single spikelets. The species will be of particular interest from a cytogenetic standpoint because we have not had it previously in our collection at Logan.

August 27: (Saturday) Returned to Chimkent and prepared the last box of seed for shipment to Moscow. The last collection was numbered D-2219. This makes 920 collections that I made during the 6 weeks in the USSR. All seed was turned over to the Regional Department of Agriculture for quarantine inspection.

August 28: (Sunday) Prepared to leave for Moscow. Went to the airport only to find that the flight to Moscow was canceled. Called Moscow and was informed that the U. S. Embassy had caught fire a few days ago and had destroyed most of my personal belongings I had left there. Nothing went right that day. Fortunately, the seed and collecting envelopes were not destroyed in the fire.

August 29: Traveled from Chimkent to Moscow. I learned that Perry Plummer was still in the hospital in Stavropol.

August 30: Met with Mr. Cheraponov at the Ministry of Agriculture. I gave him the following summary of the positive and negative aspects of the trip:

POSITIVE ASPECTS

1. Soviet hosts at each location (Stavropol, Tselinograd, Alm Ata, Dzhambul and Chimkent) were always hospitable and friendly.

2. Our hosts were frequently willing to work with us on weekends and beyond normal working hours.

3. The land transportation arrangements were excellent. We were provided with one to three vehicles with drivers.

4. When Plummer was forced to drop out, VIR sent their forage specialist, Dr. A. I. Ivanov, to assist with the collecting. His help was welcome.

5. Local botanists agreed to collect and send us seed of species whose seeds were immature at the time of our visit. (We must follow through with specific requests.)

6. Collecting in the Stavropol Kray was the most effective because:

a) The Botanical Garden Director provided competent botanists to accompany us.

b) We were allowed to carry a lunch to the field and work long hours.

c) The Botanical Garden Staff willingly shared their seed stocks with us.

7. Personal contacts established with individual scientists have laid the groundwork for seed exchange by correspondence.

8. More than 1,000 collections (Dewey, 920; Plummer, 185 collections) were made of a wide range of grasses, legumes, forbs, and shrubs. A complete list of the collections is given in the Appendix.

NEGATIVE ASPECTS

(These comments apply largely to the expedition in Kazakstan)

1. The itinerary was too inflexible and confining. We were occasionally taken to areas that were heavily grazed and had no seed.

2. Too many people accompanied us to the field. There was usually six to eight Soviets with us, whereas three or four would have been sufficient.

3. Large and lengthy mid-day meals interfered with productive collecting. Often, 2 to 3 hours were devoted to the meal. A sack lunch is sufficient.

4. Quarantine procedures were cumbersome. All seed had to be turned over to the quarantine officials and we were not permitted to hand-carry the seed to Moscow. These restrictions were not imposed on the Soviet collectors who were with us.

5. Officials of the Shorthandy Grain Research Institute (near Tselinograd) and the Kazakstan Institute of Grassland Agriculture (Alma Ata) were unwilling to share their seed stocks in spite

of repeated request (Mr. Cherapanov promised to remedy this problem).

6. We were unable to make significant collections of Elymus junceus (Russian wildrye) and desert shrubs. Our itinerary did not take us to areas where Russian wildrye was prevalent, and we were too early in the season to collect most shrubs.

7. Too much time was spent in "sight seeing" and visiting institutions at the expense of collecting time in the field.

8. The seed was handled by too many people after is has been collected. The seed usually went from: 1) the collector, to 2) local agricultural department officials, to 3) quarantine officer, back to 4) local agricultural officials, to 5) Ministry of Agriculture in Moscow, to 6) U.S. Embassy, to 7) U. S. Quarantine station, to 8) Beltsville. This procedure is time consuming and increases the risk of the seed being lost or mixed.

Because of the above limitations, our collecting efforts were probably no more than 50% as successful as they could have been. Nevertheless, valuable collections were made, and those collections will more than justify the expense in money and manpower needed to obtain them.

Called at the U.S. Embassy and reported my trip to Mr. Alan Trick, Agricultural Attache. Only 1 box of seed, in addition to the box I carried form Stavropol, had arrived in Moscow. This box was shipped from Tselinograd and I was very concerned that the 4 boxes from Stavropol had not yet arrived. We sent nine boxes of seed to Moscow.

From	Number of Boxes
Stavropol	5 (one was hand-carried to Moscow)
Tselinograd	1
Alma Ata	1
Dzhambul	1
Chimkent	1
Total	9

The large box of seed from Stavropol that was in the Embassy fire was repackaged in three smaller boxes by the Embassy staff. I asked Mr. Trick to follow up on the missing boxes of seed and to ship all seed and collecting boxes to Beltsville via diplomatic pouch mail. I was not given an explanation why the first box of seed and living plant material was still in the Embassy at the time of the fire. I lost over $200 worth of personal clothing, etc. in the fire.

August 31: Traveled from Moscow to London

September 1-14: (Annual Leave in England)

September 15: Traveled from London to Washington, D.C.

September 16: Reported the trip to Mr. Edminster. I gave essentially the same report I have given to Mr. Cheraponov in Moscow (see Pages 15-16). I was to have a debriefing at the US-USSR Secretariat Office, but no one came to the debriefing except Laurie Law. I found that she and Mr. Plummer had returned to the U.S. about a week earlier. I have since visited with Mr. Plummer and he seems to be recuperating satisfactorily.

After my return to Logan, I prepared the following recommendations for future exchange of plant collecting teams between the US and USSR and sent these recommendations to Mr. Edminster:

RECOMMENDATIONS

1. Continued exchange of plant-colleting teams between the US and USSR is desirable and necessary. The USSR has the world's largest store of forage germplasm, and only a small part of the country had been adequately explored by plant collectors.

2. Expedition itineraries should be jointly developed by plant collectors in both countries, and wide flexibility should be allowed in timing and location.

3. Procedures for getting the seed out of the USSR needs to be simplified. Quarantine inspections should be the responsibility of the receiving country. Collectors should have the option of hand-carrying the seed to Moscow.

4. Germplasm exchanges between individual scientists should be encouraged and facilitated. However, all seed should be sent through appropriate offices at Leningrad and Beltsville.

APPENDIX
SUMMARY OF COLLECTIONS FROM THE DEWEY-PLUMMER EXPEDITION TO THE USSR JULY-AUGUST 1977

		No. of Collections	
Species		**Dewey**	**Plummer**
Acer	*ginnola*	1	
	semenovi	1	
	sp.	2	
Achillea	*micrantha*		3
	millefolium		6
	nobilis		1
	officinalis	2	
	sp.	2	
Agrimonia	*eupatoria*		3
Agropyron	*caninum*	4	
	cristatum-pectiniforme	64	3
	desertorum-sibiricum	87	3
	elongatiforme	17	
	fibrosum	1	
	gracillimum	1	
	intermedium-	89	
	lolides	3	
	repens	28	1
	trachycaulum?	2	
	repens X desertorum?	1	
	repens X cristatum?	1	
	sp.	10	
Agrostis	*gigantea*	3	1
	sp.	4	
		No. of Collections	
Species		**Dewey**	**Plummer**
Alcea	*nudiflora*	2	
	rosea	5	
	rugosa		1
Aleuropus	*repens*	4	
Allium	*pulchellum*		1

	sp.	4	
Alnus	*nigra*	1	
Althaea	*officinalis*	1	
Amygadulus	*tedekuriana*	1	
Anthyllis	*polyphyllus*		
	volneria		
Arrhenatherum	*elatius*	2	
Artemisia	*austrica*		2
	vulgaris	2	
	sp.	1	
Asparagus	*sp.*	2	
Astragalus	*asper*	1	
	bungeanus	3	1
	calycinus?	1	
	cicer	1	
	falcatus		1
	ocitropys?	1	
	pisocalix?	1	
	ponticum	1	
	siversianus	1	
	suffruticosis?	1	
	sulcatus	1	
		No. of Collections	
Species		**Dewey**	**Plummer**
	sp.	12	
Ballota	*niger*		1
Baptisa	*australis*	1	
Betonica	*officinalis*		1
Betula	*manchurica*	1	
Bothriochloa	*ischaemum*	2	5
Brachypodium	*pinnatum*	4	

	sp.	5	
Briza	*elatior*		2
Bromus	*inermis*	30	2
	ramosus	2	
	rigidus		1
	riparius	12	1
	variegatus	1	1
Calamagrostis	*epigeus*	6	6
Calligonum	*ophillum*	1	
	rotula	8	
	turbinoum	1	
Carex	*compacta*		1
	gracilis	1	
	junceus		
	melanostachya	2	
	sp.	8	
Chaerophullu	*maculatum*		2
Chandrilla	*lejosperma*	1	
		No. of Collections	
Species		**Dewey**	**Plummer**
Cerarel	*maheleb*		1
Convovulus	*pseudocantabri*	2	
Cornus	*sp.*	1	
Coronilla	*varia*	6	1
Cotoneaster	*lucida*	1	
	melanocarpa	1	
		1	
Crategus	*pentagina*	1	
	sanguinea	1	
	sp.	3	
		1	
Cytisus	*rutenicus*	1	1

Dactylis	*glomerata*	26	
Delphinium	*schmallhauseni*	1	
Deschampsia	*caespitosa*	1	
	sp.	3	
Dictamnus	*caucasicus*		2
			1
Dipstachne	*bulgarica*		1
			3
Echium	*vulgare*		3
Elaegnus	*angustifolia*	1	
Elymus	*akmolensis*	1	
	angustus	13	
	dahuricus	1	
	junceus	7	
	multicaulis	9	
	nutans	1	
	ramosus	5	
		No. of Collections	
Species		**Dewey**	**Plummer**
	sp.	4	
Eremuzus	*regelia*	1	
Euphorbia	*sp.*	1	1
Festuca	*arundinacea-orientalis*	14	
	beckeri	1	1
	gigantea	2	
	pratensis	3	
	sulcata	18	6
	turanica?	1	
	vallesiaca		1
	sp.	7	
Fraxinum	*pubescens*	1	
Galium	*rutenicum*	6	

Geranium	*sanguineum*		1
	sp.	1	
		1	
Glycyrrhiza	*glabra*	2	
	sp.	2	
Gypsophila	*globosum*		1
	paniculata		1
Hedysarum	*tashkenticum*	1	
Helichysium	*arenarium*		2
Helyotropus	*arguzoides*	2	
Heracleum	*asperum?*		2
	montegacianum		3
Hordeum	*bogdanii*	2	
		No. of Collections	
Species		**Dewey**	**Plummer**
	bulbosum	4	
	violaceum	3	
Inula	*aspera*		1
	helenium	1	1
	germanica		1
Irida	*australis*	1	
Iris	*cloudousii*	1	
	halophila	1	
	notha	1	
	pumila	6	
	songarica	2	
	tenuifolia	1	
	timofejensii	1	
	sp.	7	
Juncus	*gerardii*	1	
Juniperus	*communis*	1	
	turkestanicum	1	

Kiteibelia	*vitifolia*	1	
Koeleria	*glauca*	1	
	gracilis	7	
	luerssenii	2	
Lapsana	*communis*		1
		3	
Lathyrus	*hirsutus*	3	
	tuberosa	5	
	sp.	2	
Lavatera	*thuringuica*		1
		No. of Collections	
Species		**Dewey**	**Plummer**
Linum	*austriacum*		2
Lotus	*caucasicus*	6	
	corniculatus	5	
	frondosus?	1	
	sp.		2
Lolium	*perenne*	1	1
Lysiagrostis	*splendens*	2	
	caragana	1	
Malus	*sp.*	2	
Medicago	*cancellata*	5	2
	coerulea	1	
	falcata	12	
	romanica	11	
	sativa	23	
	tianschanica	2	
	varia	2	
	sp.		1
Marmbium	*praecox*		1
Melica	*transilvanica*	2	
	sp.	1	

Melilotus	*alba*	4	
	dentatus	1	
	officinalis	11	1
Muretia	*transitoria*	2	
Onobrychis	*inermis*	3	2
	frandis	1	
	sativa	4	
		No. of Collections	
Species		**Dewey**	**Plummer**
	wasilchenkovii	1	2
Ononis	*hiztina*		1
Origanum	*vulgare*	2	
Oxytropis	*sp.*	1	
Padus	*racemosa*	1	
Paeonia	*tenuifolia*		1
	sp.	2	
Phalaris	*arundinacea*	5	
Phleum	*phleoides*	11	
Phlomis	*pungens*		1
Poa	*bulbosa*	1	
	compressa	2	1
	iberica		1
	pratensis	9	1
	sp.	2	
Polygonum	*divaricata*		1
Potentilla	*adenthphilla*		1
	argenta	1	1
Poterium	*polyganum*	2	
Prunus	*nuna*		1
	sogdiana	2	
Puccinellia	*distans*	1	

Pyrus	*communis*		2
	sp.	2	
		No. of Collections	
Species		**Dewey**	**Plummer**
Rhamnus	*catharicus*	1	
Ribes	*saxatile*	1	
Rosa	*beggariana*	1	
	canina	1	2
	cokanica	1	
	spinosissima	2	
	sp.	5	
Salvia	*officinalis*	2	
	tesquicola		2
Sanguisorba	*sp.*	2	
Scabiosa	*ochroleuca*	1	
Secale	*montanum*	1	
Sida	*hermophrodila*	1	
Silene	*latifolia*		1
Silphium	*perfoliatum*	1	
Spirea	*japonica*		1
Stachys	*germanica*		1
Stipa	*cappilata*	1	
Teucrium	*polium*		2
Thymus	*marschallianus*		3
	sp.		1
Trichodesma	*incanum*	1	
Trifolium	*agrarium*	3	
	alpestre	1	2
		No. of Collections	
Species		**Dewey**	**Plummer**
	ambiguum	20	28

	arvense	1	
	campestre		1
	diffusum	3	
	fragiferum	4	1
	medium		4
	montanum	1	
	parviflorum	1	
	pratense	8	1
	repens	3	
	rubens		1
	strepinis		1
	trichocephalum	1	1
Tsentaria	*mycrantus*		1
Tulipa	*greigii*	1	
Verbascum	*pyramidatum*		1
Vicia	*angustifolia*	5	
	cracca	12	2
	pannonica	1	1
	tenifolia	3	2
	tetrasperma	2	2
	sp.	5	
			1
Viola	*tricolor*		1
Xeranthemum	*annum*		
Unidentified		9	
	TOTAL	920	174
			1,094