

PLANT GERMPLASM COLLECTION REPORT

USDA-ARS
FORAGE AND RANGE RESEARCH LABORATORY
LOGAN, UTAH

Foreign Travel to:

China

August 12-September 12, 1991

TITLE: Collection and Evaluation of Forage Germplasm from the Xinjiang Autonomous Region of P. R. C.

U.S. Participants

*[Dr. Douglas A. Johnson](#) - Plant Physiologist
USDA-Agricultural Research Service
Logan, Utah U.S.A.*

*Dr. Melvin D. Rumbaugh
USDA-Agricultural Research Service
Logan, Utah U.S.A.*

GERMPLASM ACCESSIONS

SUMMARY: The objective of our trip was to make joint seed collections of wild and

cultivated forage legumes, grasses, and shrubs suited for use on arid and semiarid rangelands in the U.S. and P.R.C. A list of potential species for collection was submitted to the Ministry of Agriculture for pre-approval on 8 May. After arriving in Beijing on 14 August, we consulted with officials of the Ministry of Agriculture, Institute of Crop Germplasm Resources, and Institute of Animal Science concerning ongoing forage germplasm research and the requirements for obtaining permits to transport seeds out of P.R.C. We flew to Urumqi on 21 August and on 22 August began our collection trip to southern Xinjiang with Mr. Yang Zhuomeng and Mr. An Shazhou from the Department of Grassland Science at August 1st Agricultural College in Urumqi. The collection trip traversed along the western edge of the Tarim Basin. The major cities along the route were Urumqi, Korla, Kuqa, Aksu, Kashi (Kashgar), Shache, and Hotien. We traveled a total distance of about 5,000 km and made 93 seed collections. Upon returning to Urumqi the seed immediately was threshed, cleaned, and weighed. A list containing the Latin name, Chinese-character names, and seed weight was compiled and given to Xinjiang government officials. Out of the 93 collections, 6 were identified as "unevaluated indigenous species," and we were not permitted to take these out of Xinjiang. The 87 collections included the following: 51 forage legumes, 33 forage and turf grasses, and 3 shrubs. Duplicate samples of all seed collections were left in Urumqi.

We flew to Beijing on 9 September and were met by Mr. Zhuang Renan of the Department of International Cooperation in the Ministry of Agriculture. Mr. Zhuang capably obtained the necessary approvals from the Institute of Crop Germplasm Resources in the Chinese Academy of Agricultural Sciences and the Department of Science and Technology in the Ministry of Agriculture. In addition, a Phytosanitary Certificate was obtained from the Beijing Animal and Plant Quarantine Service. We flew to the U.S. on 12 September and delivered our seed collections to USDA-APHIS officials at the San Francisco Airport, who forwarded them to the USDA Plant Introduction Office for processing.

RECOMMENDATION: Both the U.S. and P.R.C. have a lot to gain from a collaborative

project to collect and evaluate forage germplasm from Xinjiang for use on arid and semiarid rangelands in their respective countries. It is recommended that a longer-term collaborative project be established to systematically initiate this research.

BENEFITS OF TRIP AND CONCLUDING REMARKS

Benefits of Trip: The collected forage germplasm will make an important addition to the germplasm banks of both the U.S. and P.R.C. These collected materials will be an important source of germplasm for the conservation and improvement of productivity on semiarid rangelands of both countries. The U.S. collections will be incorporated into the National Plant Germplasm System where it will be available to all qualified scientists and organizations, both domestic and foreign, for use in their ongoing work. Similarly, in P.R.C. the Institute of Crop Germplasm Resources in Beijing will make the collections available to forage scientists throughout P.R.C.

This trip report will be sent to cooperating scientists in P.R.C. and to interested parties in the U.S. Slide presentations by U.S. participants at Crop Advisory Committee meetings, Regional Research Committee meetings, and various seminars will inform scientists of the collection trip and opportunities for collaboration.

Because of the excellent cooperation received on our trip, a proposal for five forage scientists from Xinjiang August 1st Agricultural College to visit the U.S. in 1992 has been submitted to the P.R.C. Ministry of Agriculture. Hopefully this proposal will be selected for funding as part of the Scientific Exchange Program. Plans have been discussed for a subsequent germplasm collection trip to northern Xinjiang for 1993. Consequently, our 1991 trip has set the stage for future longer-term scientific exchanges between scientists at Urumqi and Logan.

Concluding Remarks: We feel fortunate to have successfully hand carried our seed collections back to the U.S. This success was undoubtedly due to a fortunate combination of factors including:

1) an excellent collaborative relationship with our cooperating scientists at Xinjiang August 1st Agricultural College in arranging our collection trip, cleaning and weighing our seed collections, and obtaining the necessary permits from Xinjiang Government officials;

2) the capable assistance of Mr. Liu Congmeng's Office (particularly Mr. Zhuang Renan) in efficiently obtaining timely export approvals from the Institute of Crop Germplasm Resources and Ministry of Agriculture and the Phytosanitary Certificate from the Beijing Animal and Plant Quarantine Service; and

3) the excellent support received from Ms. Lucia Claster at USDA-OICD in arranging our trip and helping us obtain pre-approval from the Ministry of Agriculture for our species collection list.

Our sincere thanks to all of these individuals for making our trip both successful and enjoyable.

TECHNICAL REPORT AND TRIP DETAILS

12-14 August: We flew from Salt Lake City to Beijing with an overnight stop in Narita, Japan.

14-21 August: We were met at the Beijing International Airport by Mr. Hu Yanan, Project Officer with the Department of International Cooperation in the Ministry of Agriculture. He served as our interpreter and guide during our stay in Beijing. He works as an assistant to Mr. Liu Congmeng, who is the Director of the Division of American and Oceania Affairs in the Department of International Cooperation at the Ministry of Agriculture.

We went to the Chinese Academy of Agricultural Sciences (CAAS) where we visited officials at the Institute of Crop Germplasm Resources. We met with Professor Jiang Chao-Yu, Deputy Director of the Institute (who visited Logan in 1979 and 1983) and Mr. Liang Feng of the National Crop Gene Bank in the Institute. Discussions focused on the general permit requirements and clearance procedures for exporting collected germplasm from PRC. After the joint collections are made, the seed should be threshed, cleaned, and weighed with a duplicate sample maintained in Xinjiang. A species list with the Latin name, Chinese-character name, and seed weight of each accession is required. The list has to be approved first by local officials in Xinjiang. The species list can then be hand-carried (or if possible) sent by FAX or telex to the Institute for approval. Institute approval usually requires 6 to 10 days for processing. Final approval by the Director of the Department of Science and Technology (currently Mr. Feikaiwei) in the Ministry of Agriculture is necessary before the seed is examined for insects, diseases, and other pathogens. This inspection is done by the Beijing Animal and Plant Quarantine Service, which is in charge of issuing a Phytosanitary Certificate.

We also were introduced to the organizational structure of the Institute of Crop Germplasm Resources. This Institute is involved in the collection and long-term storage of germplasm of major crop species and their wild relatives. They are also responsible for coordinating seed requests and exchanges with other countries. The Institute has two main facilities for gene bank storage. Gene Bank No. 1 has two rooms and was designed and built in 1984. One room has 110 m² of space and is capable of storing 80,000 accessions at -10C. The second room has 214 m² of

space and can store 150,000 accessions at 0C. Gene bank No. 2 has an area of 3,000 m² and was jointly funded by PRC (the building), Rockefeller Foundation (\$1.25 million for equipment), and International Board on Plant Genetic Resources. This facility was completed in 1986 and has two rooms capable of storing 400,000 accessions at -18C and <50% relative humidity. Currently the facility houses 205,000 accessions and another 100,000 accessions hope to be added in the next 5 years. Another 20 provincial gene banks capable of storing seeds at 0C are located throughout PRC. The Grassland Research Institute at Hohehot, Inner Mongolia stores 30,000 accessions at 0C.

We were taken on a tour of Gene Bank No. 2. The facility has various laboratories and excellent equipment for seed processing, fumigation, drying, packaging, germination, tissue culture, low-temperature research, storage, and germplasm inventory. There are 4 temperature-controlled rooms for research and 2 for long-term storage. Seeds are stored in vacuum-sealed cans or foil bags. The germplasm inventories are being maintained on Compaq 38620 computers. There are currently 1,559 forage accessions in their inventory (Table 1). The breakdown for the individual species in the genera *Medicago* (520) and *Agropyron* (239) is contained in Table 2. They indicated that 24,000 accessions of seed have been distributed to other countries, and 100,000 accessions were sent to scientists in PRC. While at CAAS, we met Dr. Kim Hummer, horticulturist with USDA-ARS National Clonal Germplasm Repository in Corvallis, Oregon. She was trying to arrange a future joint collection trip to P.R.C. for *Ribes* germplasm.

We also met with Mr. Zhang Yufa (who had previously studied and worked at our research laboratory with Dr. Douglas R. Dewey) and others on staff with the CAAS Institute of Animal Science. They discussed their ongoing research which included: adaptation trials of 33 alfalfa varieties from the U.S., salt tolerance of forage grasses, tissue culture salt tolerance, alfalfa salt tolerance in seashore areas, poisonous plant research with *Astragalus* species, distribution of *Medicago ruthenica*, and drought and heat tolerance of *M. ruthenica*.

Originally we were supposed to be in Beijing for only about 3 or 4 days; however, because of heavy tourist travel to Xinjiang, we were unable to get tickets for our flight from Beijing to Urumqi. During our stay in Beijing, we were taken to numerous historical and cultural sites. The Ministry of Agriculture was finally able to secure tickets for a 3 1/2 hour flight to Urumqi on 21 August.

21 August: We were met at the Urumqi Airport by Professor Min Jichun (Associate Professor and alfalfa breeder) and Mr. Yang Zhuomeng (Lecturer and grass breeder) of the Grassland Science Department at Xinjiang August 1st Agricultural College. We were then taken to our lodging in a campus dormitory at the college where agricultural cadre (leaders) are housed when taking courses. We had a general discussion of our collection trip and learned that we were departing on our trip the next morning. We learned that the Grassland Science Department had just gotten a new small-size pickup with a crew cab for our trip. We were to be accompanied on our trip by Mr. Yang Zhuomeng, Mr. An Shazhou (Lecturer in the Grassland Science Department with a specialty in plant taxonomy), and a driver. Travel permits could not be obtained for collecting in the vicinities of the villages of Xiejiagou, Kangiwar, Minfeng, and Xoxlax.

The Xinjiang Autonomous Region is the largest administrative division in P.R.C. and covers an area of about 1.6 million km². Xinjiang is a climatic analog of the Intermountain Region of the U.S. Xinjiang has vast deserts, high mountains, saline soils and lakes, and fertile valleys very similar to those of the western U.S. Xinjiang has 57.3 million ha of rangelands or 20.2% of the rangeland in PRC. About one-third of the total area of Xinjiang is comprised of grasslands. The major ecosystem classification of these grasslands and their corresponding percentages are: desert (45%), steppe (27%), meadow (26%), and swamp (1%).

August 1st Agricultural College was founded in 1952 and is the lead institution for undergraduate and graduate education in agricultural sciences in Xinjiang. The campus covers 122 ha and has buildings for teaching and research as well as dormitories and apartments for students and staff. The College has 77 laboratories, various experimental farms, greenhouses, orchards, a hospital, primary and middle schools, and athletic facilities. There are 800 full-time faculty including 200 Professors and Associate Professors, 330 Lecturers, and 270 Assistant Lecturers. There are currently about 3,000 regular students and 1,000 correspondence students. Departments include: Agronomy, Horticulture, Plant Protection, Forestry, Grassland Science, Animal Husbandry, Small and Large Animal Medicine, Hydrotechnical Engineering, Agricultural Engineering, Agricultural Economics, Agricultural and Animal Products Processing, Basic Courses, and Basic Biological Courses. The College has produced more than 14,000 specialists and technicians in various fields of agricultural science. The Ph.D. degree is not offered, but 21 M.S. degrees have been awarded. Collaborative relationships have been established with Cornell University at Ithaca, NY, and with Grand Canyon College near Phoenix, AZ.

22 August: After packing our vehicle and purchasing miscellaneous supplies for our collection trip, we left Urumqi at about 11:00 a.m. Our collecting route took us around the perimeter of the Tarim Basin. The Basin is surrounded by the Tian Shan, Kunlun, and Altun Shan Mountain ranges, which reach more than 6,000 m in elevation. The Basin is a flat depression lying about 1,000 m above sea level and near Turfan has the second lowest elevation in the world (-154 m). The Basin has an arid environment and receives from less than 20 to about 150 mm of annual precipitation. The highest elevations of the surrounding mountains receive as much as 600 mm annual precipitation. Runoff from melting snow and glacial ice flows into the Basin, an area with only interior drainage. Water from these streams and rivers has been extensively diverted and utilized to support irrigated crop production. The interior of the Tarim Basin is occupied by the Taklamakan Desert, the second largest desert in the world.

The land in the Tarim Basin has been classified into the following categories: desert, desert grassland, meadow, and swamp (Table 4). The Basin vegetation generally is dominated by a relatively few number of plant species. Most species have high lignin content and low palatability for livestock. The forage that is available is generally more suitable for grazing by camels, goats, and sheep than by cattle. Soils in the Basin generally have a high salt content so many plant species are resistant or tolerant of salinity. Very limited research has been conducted

to evaluate the plant species of Xinjiang for their potential use in revegetating deteriorated cropland areas of Xinjiang.

Although the main road that we traveled was asphalted, the road was extremely rough in many places and was heavily traveled by trucks so that our speed averaged only about 60 km/h. Because we traveled up to 550 km per day, our collecting time was often limited. In addition, bureaucratic clearances from government officials in the Foreign Affairs Office at each location had to be obtained before we could collect in each of the areas. Also, we usually had to obtain assistance from officials in the Bureau of Animal Husbandry in each town to guide us to the collecting sites and help in translating the local language. Our extra four days in Beijing, the long travel distances, slow vehicle speeds, difficult roads, and bureaucratic requirements limited our actual collecting time in Xinjiang. Consequently, we were not able to obtain as many collections as we had hoped. However, our hosts were willing to spend long hours on the road and were extremely helpful in trying to maximize our limited collecting time.

We traveled from Urumqi through Toksun and Yanqi on our way to Korla. Along the way we had to repair a flat tire, fix a leaky radiator hose, and wait for more than an hour for the clearing of a traffic accident. We arrived in Korla at 11:30 p.m.

23 August: After obtaining a local guide at the Agricultural Bureau and clearances from the Foreign Affairs Office, we made 9 seed collections W and SW of Korla. We then drove to Kuqa and arrived at 11:00 p.m.

24 August: We went to the Foreign Affairs Office in Kuqa and obtained the necessary clearances for collecting. We made 5 seed collections S of Kuqa. We arrived in Aksu at 9:30 p.m.

25 August: We departed from Aksu at 10:00 a.m. and arrived in Kashgar at 7:30 p.m. After discussing our itinerary with Mr. Yang and Mr. An, we decided not to travel all the way to Minfeng or along the Kara Kash River towards the interior of the Tarim Basin. This would allow us more time to make collections along the way.

26 August: We went to the Foreign Affairs Office in Kashgar for our clearances, and then went to the Bureau of Animal Husbandry to obtain a local guide. We made 13 seed collections W and SW of Kashgar.

27 August: We drove to Shache with our Kashgar guide, checked in at the Foreign Affairs Office, and then made 11 seed collections in the vicinity of Shache with local guides.

28 August: We left Shache and stopped near Yecheng and Pishan for 3 seed collections. We went through the arrival formalities at the Foreign Affairs Office in Hotien and learned that we would not be permitted to stay overnight at Pixa Village for collecting on 30 August. We will have to return to Hotien for the overnight stay. We met the Vice Director of the Grassland Division and discussed the itinerary for our stay in Hotien.

29 August: The Director of the Grassland Station accompanied us, and we made 6 collections W of Hotien.

30 August: We left for Pixa Village located S of Hotien and drove along the Yurung Kash River in the Middle Kunlun Mountains. We arrived in Pixa at about 2:30 p.m. and immediately left for a desert steppe area via a Beijing jeep. We made 11 seed collections S of Pixa. This is the best area that we encountered for collecting. It is unfortunate that the Foreign Affairs Office would not allow us to stay overnight at Pixa for another day of collecting. We arrived back in Hotien at 11:00 p.m.

31 August: We departed Hotien and arrived in Kashgar at 7:30 p.m.

1 September: We drove from Kashgar and arrived in Aksu at 7:30 p.m., making 1 seed collection along the way.

2 September: We went to the Grassland Station of Aksu Prefecture, the Bureau of Animal Husbandry, and the Foreign Affairs Office. We made 12 collections in the Aksu vicinity. We also visited the Wensu County Grassland Improvement Station, located 19 km NW of Aksu. This station is administered from Urumqi through the Xinjiang Autonomous Region Government. The Station was started in 1985 to demonstrate pasture development procedures in desert areas. After an orientation presentation, we were taken on a walking tour of the Station's laboratory facilities and field plots. Seed of 2 legume accessions were donated by the Station.

3 September: We left Aksu, went through Kuqa, and arrived in Korla at 8:00 p.m.

4 September: We left Aksu and drove 470 km to Urumqi. We made 6 seed collections enroute and outside of Urumqi encountered another bad accident which stopped traffic for more than an hour. We arrived in Urumqi at 10:15 p.m.

5 September: We spent the day organizing our seed collections, preparing a master list of our collections, and identifying those collections that required taxonomic verification. Mr. Yang and Mr. An then took our collections to the Grassland Science Department at Xinjiang August 1st Agricultural College where the seed will be threshed, cleaned, and weighed. In addition, 14 seed samples of alfalfa landraces, other legumes, and forage shrubs were added to our collection by various researchers at August 1st Agricultural College.

6 September: We drove to Hutubi Dairy Farm, which is located 70 km W of Urumqi and were accompanied by Mr. An and President Xu Peng, who also is serving his second 4-year term as Vice Chairman of the People's Congress of Xinjiang. During our ride to Hutubi, we discussed the details of our collecting trip and also future collaborative research.

August 1st Agricultural College has had a long cooperative relationship with Hutubi Dairy Farm. This year the construction of the Hutubi Grassland Research Station has been completed. Funds

to construct this research station and support a 5-year research project are being provided by the Xinjiang Autonomous Region Government, the Chinese Academy of Sciences, and Hutubi Dairy Farm. The main purpose of this station is to provide facilities to conduct research on the reclamation and utilization of salt-affected soils in the Dzungarian Basin area. The station includes a recently completed laboratory with 10 to 12 rooms and a dormitory to provide accommodations for researchers. In addition, animal care facilities have been constructed and ample land area is available for research plots.

We were taken to the field where we observed adaptation trials in saline soil (up to 2% salt content). These extensive trials were evaluating the germination, growth, and survival of both native and introduced forage species. Some of the plots included seed that we had brought to Xinjiang last year. The species that were doing particularly well included: *Leymus racemosus*, *Thinopyron elongatum*, *Leymus angustus*, *Agropyron desertorum*, *Festuca arundinacea*, *Puccinellia* spp., *Artemisia* spp., *Kochia* spp., and the *Medicago sativa* (alfalfa) cultivars 'Spredor 2' and 'Deseret'. In addition, we were taken to 1 hectare (2.5 acre) field plots where 7 planting combinations of tall fescue, alfalfa, sweet clover, and sainfoin are being evaluated for their forage production capability and persistence under saline conditions. Alfalfa was doing particularly well in these plots. We returned to Urumqi at 10:30 p.m.

7 September: We met with Mr. Shi Ding-sui (Director of the Grassland Science Department, August 1st Agricultural College), Professor Min Jichun, Mr. Yang Zhuomeng, and Mr. Wu Xing Rong (Lecturer in the Grassland Science Department) concerning an exchange proposal for five Chinese scientists to visit the U.S. in 1992. We worked until 10:30 p.m. on the proposal and finalized an itinerary for their visit. The main purpose of their visit will be to observe U.S. technology for forage seed production, the U.S. Plant Introduction System, germplasm inventory and storage procedures, ongoing forage improvement programs, and rangeland reclamation projects. Proposed locations to visit include: Davis, CA; Corvallis, OR; Pullman, WA; Prosser, WA; Caldwell, ID; Ft. Collins, Co; Meeker, CO; Provo, UT; and Logan, UT. We propose to accompany them on their 30-day visit. Hopefully their proposal will be selected as one of the proposals for the 1992 USDA-OICD and Ministry of Agriculture Scientific Exchange Program.

We also learned during the day that officials in the Xinjiang Autonomous Region Government confiscated 6 of our seed collections. The reason given was that these collections were "previously unevaluated indigenous materials." Our hosts indicated that they tried hard to get these collections released, but the government officials refused to allow them to be taken out of Xinjiang. Consequently, we will be allowed to take a total of 87 collections to Beijing.

8 September: This was a "rest day" spent packing, touring the city, and shopping. In the evening we had a formal meeting in the reception room of the cadre dormitory with President Xu Peng, Mr. Lau (Foreign Affairs Office), Director Shi Ding-sui, Professor Min Jichun, Mr. Yang Zhuomeng, and Mr. Wu Xing Rong. We were formally presented our approved seed collections, and we discussed our future collaborative interaction concerning the joint collection and evaluation of Xinjiang forage germplasm. It was agreed that each side would try to secure funding from their respective governments for the collaborative research. Mr. Yang read the draft version of their proposal to visit the U.S. in 1992, and changes were recommended. Both

sides agreed that a joint collection trip to northern Xinjiang will be planned for 1993. We then went to the cadre dining hall where we had a formal banquet dinner.

9 September: We traveled from Urumqi to Beijing by plane and were met at the Beijing Airport by Mr. Zhuang Renan (Project Officer in Mr. Liu Congmeng's office). We discussed our collection trip with Mr. Zhuang and the approvals that had been obtained for our seed collections. Apparently the permits obtained in Xinjiang were just for transporting our seed out of Xinjiang, not out of Beijing. We then packed our seed collections in a shipping box, made copies of the collection inventories, and prepared a letter to USDA-APHIS officials for inclusion in the shipping box.

10 September: We telephoned Mr. Edwin Bauer, Agricultural Attache at the U.S. Embassy in Beijing and informed him of our collection trip to Beijing. Mr. Zhuang came to the Jianguo Hotel with officials from the Beijing Animal and Plant Quarantine Service, and they took the seed collections for processing. Mr. Zhuang obtained the necessary approvals from the Institute of Crop Germplasm Resources in the Chinese Academy of Agricultural Sciences and then the Department of Science and Technology in the Ministry of Agriculture.

11 September: We walked to the United Airlines office and obtained our confirmation tickets for our flights back to the U.S. Mr. Zhuang delivered our seed to Mr. Zhang Yong Hua (Deputy Director and Pathologist with the Beijing Animal and Plant Quarantine Office). Mr. Zhang's staff examined our collections for various pests and diseases and issued a Phytosanitary Certificate for our collections late in the afternoon. We had to pay 454 Yuan (\$85.82) for the issuance of the Certificate. That evening we had an excellent Chinese barbecue dinner with Mr. Zhuang and Mr. Huang Yongning, Director General of the Department of International Cooperation in the Ministry of Agriculture.

12 September: We traveled from Beijing to Logan, Utah, via Shanghai, Narita, San Francisco, and Salt Lake City.

NAMES AND ADDRESSES OF CONTACTS

Department of International Cooperation, Ministry of Agriculture, No. 11, Nong Zhan, Guan Nan Li, Beijing 100026, P.R.C.

Huang, Yongning - Director General (previously was Agricultural Attache for two years in Washington, D.C.)

Liu, Congmeng - Director of Division of American and Oceania Affairs

Zhuang, Renan - Project Officer in the Division of American and Oceania Affairs

Hu, Yanan - Project Officer in the Division of American and Oceania Affairs

Institute of Crop Germplasm Resources, Chinese Academy of Agricultural Sciences, 30 Bai Shi Qiao Road, Beijing 100081, P.R.C.

Jiang, Chao-Yu - Professor and Deputy Director of the Institute

Liang, Feng - Associate Professor and Deputy Director of the National Crop Gene Bank

Institute of Animal Science, Chinese Academy of Agricultural Sciences, Malianwa, Haidian, Beijing 100094, P.R.C.

Zhang, Yufa - Researcher (previously studied at Logan)

Beijing Animal and Plant Quarantine Service, No. 7 Bei San Huan Zhong Lu, Beijing 100011, P.R.C.

Zhang, Yong Hua - Deputy Director, Senior Agronomist, and Pathologist

Xinjiang August 1st Agricultural College, 42 Nanchang Road, Urumqi, P.R.C.

Xu, Peng - President and Professor of Grassland Science (also Vice- Chairman of People's Congress of Xinjiang)

Wang, Tong - Director of President's Office and Foreign Affairs Office

Lau, Mr. - Administrator in the Foreign Affairs Office

Shi, Ding-sui - Chairman and Associate Professor in the Grassland Science Department

Min, Jichun - Associate Professor in the Grassland Science Department, Head of Forage Breeding Group (also a member of the Forage Crop Committee of China and the Crop Cultivar Registration Committee of China)

Yang, Zhuomeng - Lecturer in the Grassland Science Department, Vice-Head of Forage Breeding Group

An, Shazhou - Lecturer in the Grassland Science Department (an excellent taxonomist)

Wu, Xing Rong - Recently appointed Lecturer in the Grassland Science Department (plant breeder)

Duddles, Nathan - Part-time lecturer in Agronomy Department (U.S. citizen with M.S. in Agronomy from University of California at Davis, along with wife Carole, spent the last few

years studying Chinese and Uighur languages at August 1st Agricultural College)

Table 1. Current forage germplasm inventory maintained at Gene Bank No. 2 as of 17 August 1991.

Species	#	Species	#
Aeshynomene	16	Kummerowia	1
Agropyron	240	Lathyrus	3
Agrostis	3	Leptochloa	1
Alopecurus	1	Lespedeza	12
Amaranthus	1	Leucaena	2
Amphioarpaea	1	Lolium	89
Aneurolepidium	3	Lotus	13
Aristida	1	Macroptilium	2
Achnatherum	2	Medicago	520
Arthraxon	1	Melilotus	51
Artemisia	1	Melinis	1
Astragalus	11	Onobrychis	37
Artiplex	1	Panicum	6
Avena	14	Pennisetum	2
Axonopus	1	Phalaris	19
Bromus	33	Phaseolus	5
Cajanus	4	Phleum	4
Calopogonium	3	Pisum	9
Cenchrus	1	Poa	20
Ceratoides	3	Polypogon	1
Chloris	3	Pos	15
Cicer	2	Psathyrostachys	8
Clitoria	1	Puccinellia/Poa	1
Coix	1	Puerariapoa	1
Dactylis	25	Roegneria	2
Desmodium	2	Sanguisorba	1
Dumbaria	1	Secale	1
Echnochloa	8	Setaria	1
Elymus	68	Silphium	2
Elymusis	3	Silphiumpoa	1
Elytrigia	57	Sonchumpoa	1

Festuca	86	Sonchus	1
Glycine	2	Sorghum	10
Hedysarum	5	Stylosanthes	4
Heterocarpum	1	Trigonella	1
Hordeum	18	Triticale	3
Indigofera	2	Vicia	28
Kochia	3	Oeniculum	1
		Trifolium	54
		TOTAL	1559

Table 2. Numbers of individual species in the genera *Medicago* and *Agropyron* in the inventory of Gene Bank No. 2 as of 17 August 1991.

Medicago Species	#	Agropyron Species	#
M. sativa	464	A. cristatum	152
M. media	37	A. dasystachyum	36
M. falcata	8	A. fragile	10
M. lupulina	4	A. intermedium	8
M. corulea	2	A. mongolicum	6
M. truncatula	2	A. sibiricum	6
M. hispida	1	A. tricophorum	6
M. spp.	2	A. spp.	15
TOTAL	520	TOTAL	239

Table 3. Seed accessions of forages collected in Xinjiang in 1991 by M. D. Rumbaugh and D. A. Johnson. Numbers in parentheses indicate the number of accessions confiscated by Xinjiang officials.

	Species	Number of Accessions
Grasses:		

	<i>Achnatherum splendens</i> (Trin.) Nevski	1
	<i>Aeluropus pungens</i> (M. Bieb.) C. Koch	2
	<i>Agrostis gigantea</i> Roth	2
	<i>Calamagrostis epigejos</i> (L.) Roth	1
	<i>C. pseudophragmites</i> (Hall. F.) Koel.	2
	<i>Chloris virgata</i> Sw.	2
	<i>Digitaria sanguinalis</i> (L.) Scop.	1
	<i>Elymus dahuricus</i> Turcz. ex. Griseb.	4
	<i>E. nutans</i> Griseb.	1
	<i>E. sibiricus</i> auct.	1
	<i>Elytrigia batalinii</i> (Krasn.) Nevski	1 (1)
	<i>E. repens</i> (L.) Nevski	3
	<i>Hordeum bogdanii</i> Wilensky	3
	<i>H. brevisabulatum</i> (Trin.) Link	1
	<i>Leymus multicaulis</i> (Kar. & Kir.) Tzvelev	2 (2)
	<i>L. secalinus</i> (Georgi) Tzvelev	6
	<i>Pennisetum flaccidum</i> Griseb.	1
	<i>Poa litwinowiana</i> Ovcz.	1
	<i>P. pratensis</i> L.	1
	<i>Stipa breviflora</i> Griseb.	1 (1)
Legumes:		
	<i>Astragalus adsurgens</i> Pall. (Gansu Seed)	1
	<i>Glycyrrhiza uralensis</i> Fisch.	1 (1)
	<i>Lotus tenuis</i> Wald et Kit. ex Willd.	2
	<i>Medicago lupulina</i> L.	3
	<i>M. sativa</i> L.	27
	<i>Melilotus albus</i> Desr.	7
	<i>M. officinalis</i> (L.) Desr.	6
	<i>Onobrychis viciifolia</i> Scop. (Gansu Seed)	1
	<i>Trifolium fragiferum</i> L.	1
	<i>T. repens</i> L.	3
Shrubs:		
	<i>Artemisia rutifolia</i> Steph. ex Spreng.	1
	<i>A. transiliensis</i> Poljak	1
	<i>Calligonum roborovskii</i>	1 (1)
	<i>Halimodendron halodendron</i> (Pall.) Voss	1

	TOTAL	93 (6)
--	-------	--------

Table 4. Various types of grazinglands and the dominant plant species present in the Tarim Basin of Xinjiang Autonomous Region, P.R.C. (from D. P. Sheehy, pers. commun.).

<u>Grazingland Type</u>	<u>Dominant Plant Species</u>		
1. Desert Grassland			
A. Sand Desert	Tamarix rammosissima, T. taklamkanesis, Darelina caspica, Phragmites communis, Scozonera spp.		
B. Saline Desert	Tamarix spp. (occasional), Halocnemum strabilacaum, Halostachys caspica, Kalidium foliatum, Lycium ruthenicum, Karelina caspica, Phragmites communis		
2. Meadow Grazingland			
A. River Meadow	Calamagrostis pseudophragmites, Phragmites communis, Oxytropis glabra, Glycrrhiza inflata		
B. Saline Meadow	Tamarix spp., Glycrrhiza inflata, Alhagi sparsifolia, Apocynum hendersonii, Phragmites communis		
C. Moist Meadow	Phragmites communis, Typha angustifolia, Potamogeton spp. and others		
D. Dry Meadow (low water table)	Phragmites communis, Poacynum hendersonii, Alhagi sparsifolia (climax), Tamarix spp., Lycium ruthenicum, Scozonera spp., Typha angustifolium, Innula ammophila (invaders)		
E. Dry Meadow (high water table)	Tamarix spp., Halimodendron halodendron, Glycrrhiza inflata, Alhagi sparsifolia, Poacynum hendersonii, Aeluropus littoralis, Phragmites communis (climax), Lycium ruthenicum, Sophora alopecuroides (invaders)		
F. Poplar Meadow	Populus euphratica, Tamarix spp., Alhagi sparsifolia, Kareline caspica, Glycrrhiza inflata, Phragmites communis, Poacynum hendersonii	3. Swamp	Phragmites communis, Juncus spp.