A Preliminary Report of the Studies on Millet Cultivation and Environmental Culture Complex in West Turkestan (1993)

Edited by M. KIMATA 1997

Field Studies Institute for Environmental Education
Tokyo Gakugei University
and
Institute of Natural and Cultural History
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December, 1997

Preface

West Turkestan has long been a very important region as a culture crossroads of Eurasia. In far ancient times, two of the oldest cereals, proso millet and foxtail millet, were domesticated here and then dispersed by nomads throughout Eurasia. People were then able to join various culture complexes using those small millets, including agricultural practices, food processing, utilization. This expedition was carried out by the joint team from Japan and Uzbekistan from June 18 to August 17, 1993 for the following purposes: 1) Collection of domesticated plants and observation of genetic diversity. 2) Observation of traditional agriculture and how it relates to local lifestyles. 3) Analysis of the cultural complex through traditional folk arts and crafts. 4) Development of teaching materials for environmental education.

This expedition was the first official scientific cooperation with Japan after Uzbekistan's independence. It was also the first time experience that Tokyo Gakugei University sent such a scientific expedition team to a foreign country. If the expedition was a success, it was entirely due to the support we received from many people. We enjoyed eating traditional food and delicious fruits, and sleeping under the Milky Way during our field trips. It was a wonderful experience in which we felt close to nature and came to know a nomadic life on the Steppes.

Members from Japan:

Dr. Mikio KIMATA (Leader), Associate professor of ethnobotany and environmental education, Field Studies Institute for Environmental Education, Tokyo Gakugei University (at present, Professor).

Dr. Hideo KITANO (Adviser), Professor of entomology and science education, Department of Science Education, TGU (Professor Emeritus).

Mr. Takaaki ISHIBASHI (Adviser), Secretary-general of Forest and Village Association.

Mr. Kiyoshi NAKAGOME, Teacher of Arts, Koto Weak Children's School (Honjo High School).

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Ms. Tomoko FUKUTOME, Graduate student of lifelong education, TGU. (Teacher)

Ms. Makiko KANODA, Undergraduate student of cultural asset sciences, TGU (Researcher, Institute of Natural and Cultural History).

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Members in Uzbekistan:

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Dr. Aleksei PIMACHEV, Botanical Scientist, Uzbek Research Institute of Plant Industry.

Mr. ABDULLA, Driver, URIPI.

Mr. KHUSAN, Cook.

Mr. ANATOR, Tour conductor of Intourist.

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Mikio KIMATA
in Bangalore, India
February 19, 1997

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Cultivation and Utilization of Millets and Other Grain Crops in West Turkestan

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Introduction

The world's most important domestication centers of millets are the Indian Subcontinent, Africa and East Asia. Their climates are characterized by semi-arid tropical savanna or temperate monsoon. Many indigenous millets have been domesticated in those regions as follows: in the Indian Subcontinent *Echinochloa frumentacea* Link, *Panicum sumatrense* Roth., *Paspalum scrobiculatum* L., *Coix lacryma-jobi* L. and so on; in Africa *Eleusine coracana* Gaertn., *Pennisetum americanum* (L.) Leeke, *Sorghum bicolor* Moench, and so forth; and in East Asia *Echinochloa utilis* Ohwi et Yabuno. The oldest millets, *Panicum miliaceum* and *Setaria italica* (L.) P. Beauv. may first have been domesticated in and around West Turkestan (Sakamoto, 1987; Kimata and Seetharam, 1997), a region called the crossroads of cultures since ancient times. Through this point cultural complexes dispersed in all directions through Eurasia and Africa (de Wet, 1989).

Millets were also dispersed, together with their agriculture basic complex; they were used not only as essential staple foods but also for other reasons. While some sorts of millets were dispersed from Africa to East Asia, others had not, and stayed at the site of original domestication (Kimata and Sakamoto, 1992; Kimata and Seetharam, 1997). It is interesting to compare traditional cultivation and utilization of indigenous Asian and introduced African millets and other cereals in West Turkestan and the Indian Subcontinent. By deriving relevant information from field surveys in Turkestan, the geographical origin and dispersal routes of millets and their basic culture complexes may be established.

Nature and environmental issues in West Turkestan

West Turkestan consists of various topographical regions, namely, the Kazakhstan Plain, Kalakum and Kijirkum Deserts, the Fergana Basin between the branch of the Tenshan Mountains and Pamir Plateau. The rivers Amdalia and Sirdalia run through the deserts into the Aral Sea. The landscape is caracterized according to observation and the plant collection list as follows. 1) South Kazakhstan: dry grassland, wheat and barley fields. Hybridization was observed between wheat (*Triticum* spp.) and weedy *Aegilops* spp. growing plenty on the levees of wheat fields and roadsides. 2) Fergana Basin: fertile irrigated fields of cotton, vegetables, fruits and rice. 3) Central Uzbekistan: dry land, irrigated cotton

fields, and rotation cropped fields of maize and alfalfa. 4) Mountainous region from Eastern Uzbekistan to the north foot of Tenshan Mountains: glass land, sub- and high-mountain regions, depending on the altitude. Ala Archa Valley National Park located on sub-mountain region (ca. 2,000 m alt.), 40 km south of Kirghistan's capital, Bishikek. The landscape was similar to the sub-mountain region of Central Japan in that Tenshan conifer grew there. 5) Kalarkum Desert in Turkmenistan and Steppe around Kalarkum Desert: dry temperate desert and grassland spread from the east of the Caspian to the Aral Sea. Maximum temperature is over 35 ℃ in summer, while the minimum is sometimes under -30 ℃ in winter. These environmental conditions are very severe for plants and animals.

The lowering of the Aral Sea is an important global environmental issue. It is detectable from aircraft how the Aral Sea is diminishing in area. The Uzbek National Museum of Natural History displays a famous photograph showing fishing vessels left in the desert far away from the coast as the sea receded. The main reason for decline is the great volume of water consumption in irrigating cotton fields and supplying urban areas. Overuse of water has been required for the maintenance of broad monoculture lands and big cities in the severely arid climate, so that most water of the Amdalia and Sirdalia are consumed before they run into the Aral Sea. This problem has a serious repercussions on the environment around the Aral Sea. The annual temperature has been becoming extremely variable, because the small Aral Sea has a weakened moderating capacity. The educed salt was brought by the north wind to cultivation fields in winter, and so many crops did not grow well in summer because of salinity in the soil.

Expedition route in West Turkestan

Many kinds of transportation were used in this expedition, which lasted from June 18 to August 17,

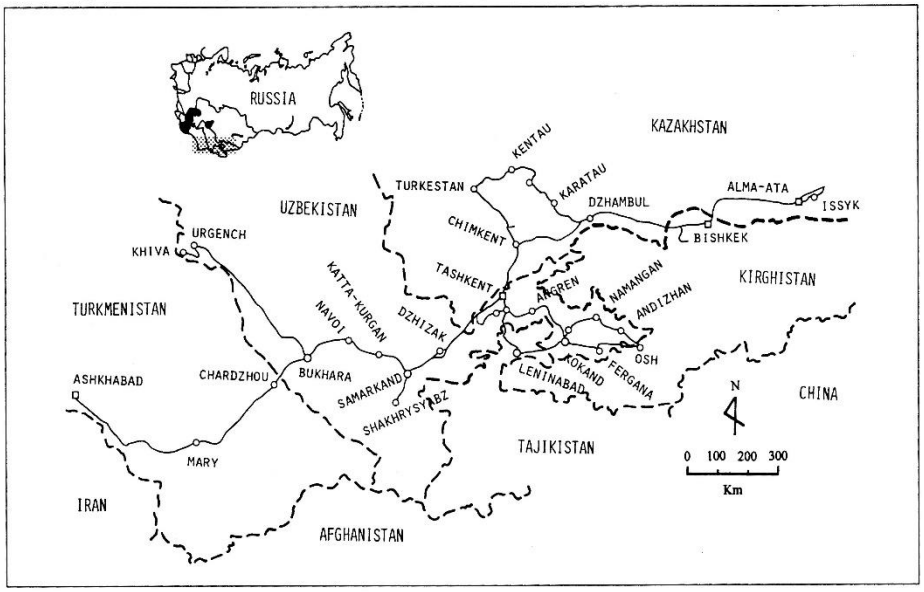

Fig. 1. Expedition route by surface transport in West Turkestan.

1993. It was difficult to obtain sufficient petrol to drive a car. An aircraft was sometimes used. The expedition route by surface transport is shown as Fig. 1. This expedition had encompassed the five countries of West Turkestan, namely, from Chardzhou to Ashkhabad in Turkmenistan, from Tashkent to Khiwa and Fergana Basin in Uzbekistan, from Chimkent to Issyk in Kazakhstan, Leninabad in Tajikistan, and Osh and Bishkek in Kirghistan. Because at that time Tajikistan was at civil war, and the vehicle did not have the capability to negotiate mountain roads, the hill regions of Tajikistan and Kirghistan were not covered.

Cultivation of millets and other cereals

Field observation and collection of plant genetic resources were conducted on the expedition. The major cereals of West Turkestan were wheat (*Triticum aestivum* L. including some spring wheat) and barley (*Hordeum vulgare* L.) in winter, while the minors were rice (*Oryza sativa* L.), proso millet (*Panicum miliceum* L.), sorghum (*Sorghum bicolor* Moench), maize (*Zea mays* L.) and foxtail millet (*Setaria italica* (L.) P. Beauv.) in summer. The plant genetic resources were collected along the expedition route and in many bazaars. These contained 562 accessions, i.e., cereals (216), pulses (34), vegetables (118), spices (32), and related wild species of domesticated plants (162), as shown in the appendix. The collection list of cereals and related weeds is shown in Table 1. In the domesticated species there were many accessions of sorghum (52), wheat (49) and proso millet (33). However, most accessions of foxtail millet, all pearl millet and much sorghum were maintained as genetic resources in Leningrad University, but these were not collected in the fields. There were many accessions of *Aegilops* spp. (26), *Agropyron* spp. (17), *Hordeum* spp. (16) (tribe Triticeae), *Setaria* spp. (19) and *Echinochloa* spp. (16)(tribe Poaceae), which were the related weeds.

Table 1. Collection list of Gramineae

Species name	No. of accessions
Domesticated plants	216
Panicum miliaceum	33
Setaria italica	17 *
Sorghum bicolor	52 *
Pennisetum americanum	18 *
Oryza sativa	9
Triticum aestivum	47
Triticum spp.	2
Hordeum vulgare	21
Zea mays	17
Weed and wild plants	132
Panicum spp.	7
Setaria viridis	13
Setaria glauca	6
Echinochloa spp.	16
Sorghum spp.	2
Aegilops spp.	26
Hordeum spp.	16
Agropyron spp.	17
Avena spp.	8
Others	21
Total	348

* Containing partly accessions maintained at Leningrad University.

Proso millet was broadly cultivated in Uzbekistan and Kazakhstan, but foxtail millet was so only near Kokand in the Fergana Basin, Uzbekistan as shown in Fig. 2. Sorghum was also cultivated broadly in Uzbekistan, Kazakhstan and Kirghistan, especially in the Fergana Basin. Yet finger millet and pearl millet could not be found in the fields, and they have not traditionally been cultivated in West Turkestan. Pearl millet (*Pennisetum americanum* (L.) Leeke) is being introduce into Uzbekistan at Bukhara

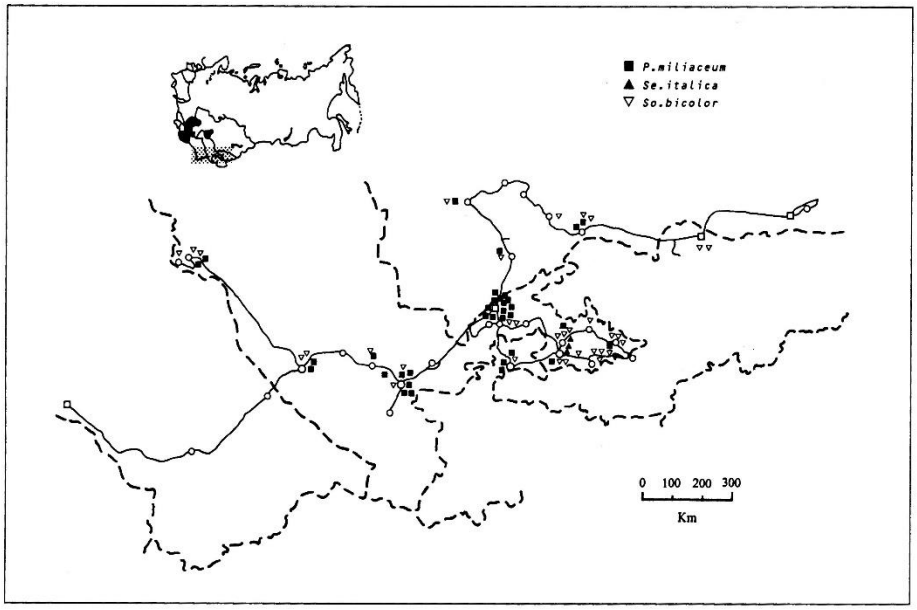

Fig. 2. Collection sites of proso millet, foxtail millet and sorghum on the expedition route in West Turkestan.

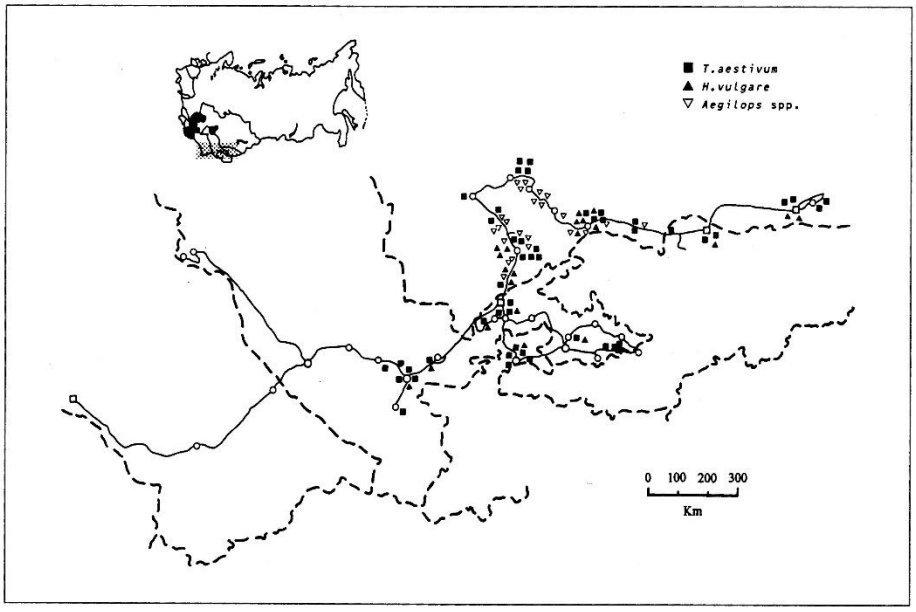

Fig. 3. Collection sites of wheat, barley and the relative wild species on the expedition route in West Turkestan.

University. Wheat and barley were widely cultivated in West Turkestan, particularly in Kazakhstan, as shown in Fig. 3. Big agriculture machines were used for broad cultivated fields in Kazakhstan. The close related weeds of wheat, *Aegilops* ssp. grew only in South Kazakhstan and the natural hybrids between these species and wheat were sometimes found at the periphery of wheat fields.

After the independence from the USSR, the agriculture system in Uzubekistan is changing from cotton monoculture to multiple agriculture. The farmers cultivate many sorts of cereal (wheat, maize, etc.), vegetables (tomato, cucumber, etc.) and fruits (cherry, peach, grapes, etc.). Severe genetic erosion occurred under the monoculture system. The genetic diversity of domesticated plants and the related wild species has decreased remarkably, which is a very serious situation, because West Turkestan was one of the most important crop domestication centers in the world. This region is regarded as the geographical origin of wheat (*T. aestivum*), foxtail millet, proso millet, peach, cherry, grapes and so forth. Sakamoto (1987) proposed a new theory that proso millet and foxtail millet had been geographically domesticated in the area within West Turkestan and the northwestern part of the Indian Subcontinent. Small volumes of proso millet were still cultivated widely in West Turkestan in 1993, as shown in Fig. 4, but foxtail millet was cultivated only around Kokand, in the Fergana Basin. The related wild plants of proso millet rarely grew on the hills, while the related weeds of foxtail millet, *Setaria viridis* (L.) P. Beauv. and *S. glauca* (L.) P. Beauv., grew everywhere in irrigated fields, roadsides and in urban gardens. *S.viridis* is the ancestor species of foxtail millet. Many varieties of sorghum have been broadly cultivated in West Turkestan since ancient times, as shown in Fig. 5. However, the other African and Indian millets have not been cultivated at all, so that the dispersal route of millets to East Asia can be considered as follows. Proso millet, foxtail millet and sorghum dispersed via two routes to East Asia, one was the north route by way of West Turkestan, and the other the south route by way of the southern foothills of the Himalayas. Yet, pearl millet was been dispersed only up to the Indian Subcontinent, and not beyond to East Asia. Finger millet, one of the African millets, was dispersed only through the south route to East Asia, including Japan.

Drought and salt tolerant varieties must be bred against desertification around the Aral Sea. Millets have excellent tolerance for drought and salinity, because they are C_4 crop plants that can be domesticated under semi-arid regions. There is a great need of reevaluation for landraces with drought and salt tolerance and traditional agriculture system. Cereal rainfed cultivation must be promoted above cotton irrigated cultivation to save water resources and help food security. Imports of sugar and cereals have often stagnated since the independence, and especially sugar is subject to a governmental supply system, so that cultivation of sugar sorghum is tried under rainfed conditions.

Preliminary evaluation data of proso millet, sorghum and other cereals

The accessions of proso millet (38), foxtail millet (3) and two weedy species (*Setaria viridis* and *Echinochloa* sp.) mixed with proso millet seeds were grown at Field Studies Institute for Environmental

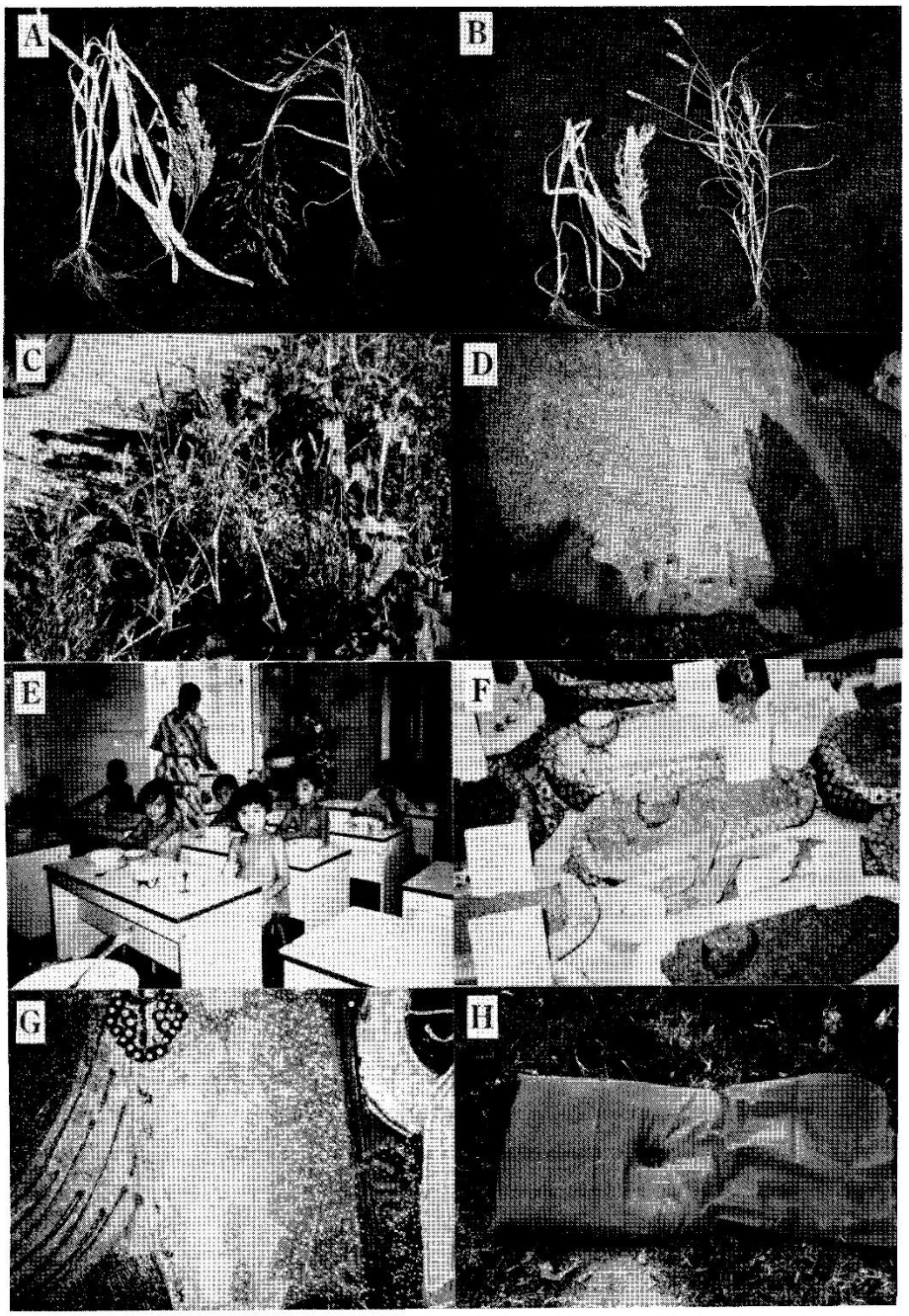

Fig. 4. Cultivation and utilization of proso millet. A, Domesticated type (left) and associated mimic weed type (right); B, proso millet (left) and foxtail millet with many tillers (right) mixed in the former seeds; C, proso millet escaped and weedy *Setaria* spp. on a roadside; D, three lemma color forms sold at a bazaar; E, children eating milk porridge (каша) in a breakfast of Кичкинтои narsery-kindergarten; F, colored grain (center) of proso millet; G, grain displayed on fine art; and H, baby's mat stuffed polished grain.

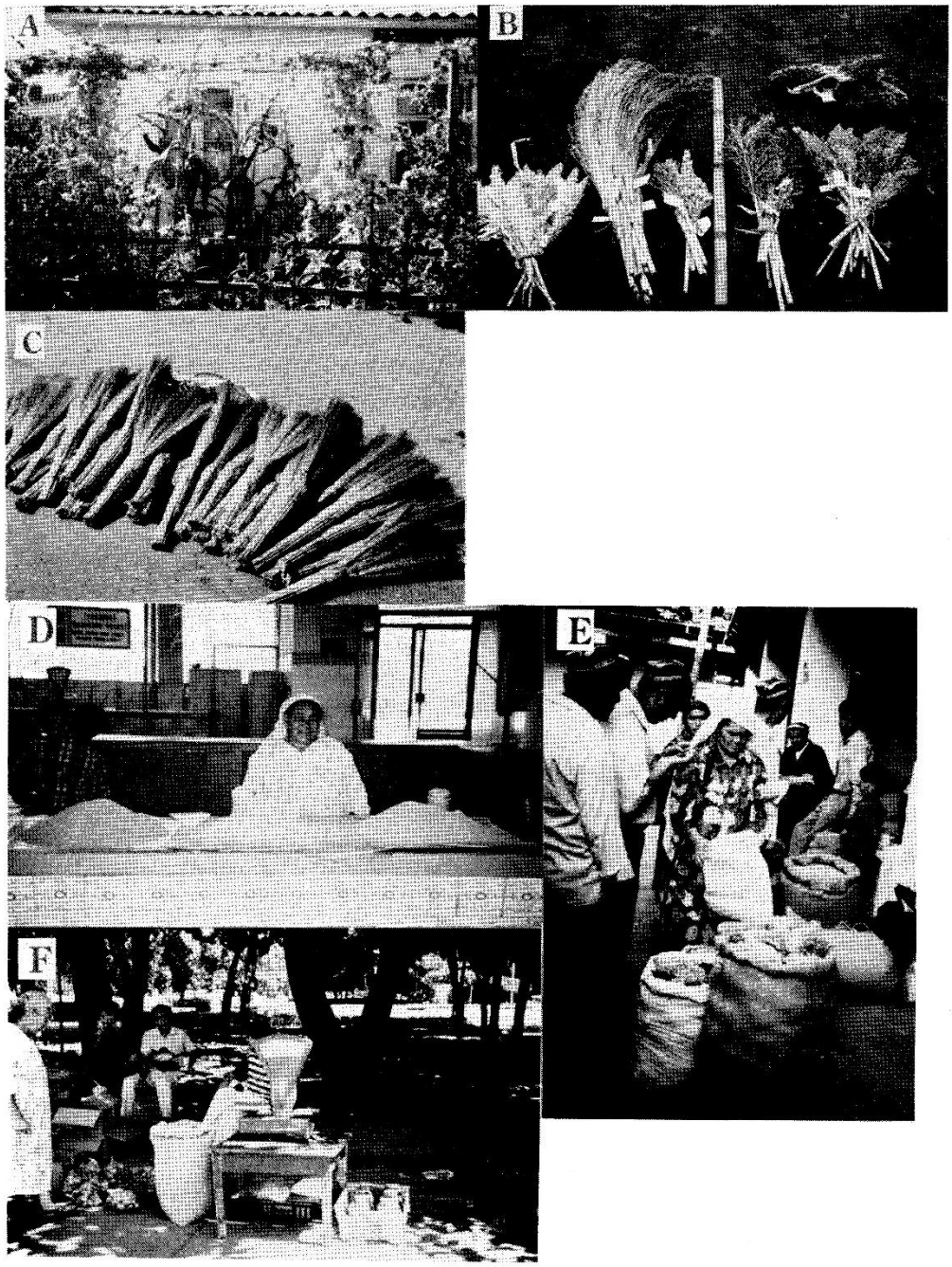

Fig. 5. Cultivation and utilization of sorghum. A, Broom sorghum cultivated in Khiva Fort; B, various ear heads of sorghum, African sorghum (left), broom sorghum, sugar sorghum A type, sugar sorghum B type (right) and grain sorghum (above); C, brooms made of sorghum at Chimkent bazaar; D, polished and milled grain of proso millet; E, grain sorghum sold at Kokand bazaar; and F, grain of proso millet sold at the city center in Tashkent.

Table 2. Several characteristics of proso millet (*Panicum miliaceum*) cultivated in Tokyo, Japan

Collection no.	Panicle form	Lemma color	Germination rate (%)	No. of tillers	Flowering date (days)	No. of leaves	Stigma color
A type							
93-6-26-1a-3	compact	brown	100	1.0	36.8	10.8	pale purple
93-6-29-2-15-1	compact	gray brown	60	1.0	35.8	10.4	pale purple
93-7-2-2-1	compact	brown	100	1.6	39.4	10.6	pale purple
93-7-6-1-25k	intermediate	brown	80	1.2	35.0	10.2	pale purple
93-7-7-1b-1-1	compact	brown	70	1.6	36.8	10.2	pale purple
93-7-13-2-3-1	compact	brown	20	1.5	37.0	10.5	pale purple
93-7-26-1	compact	brown	100	1.8	36.2	9.8	pale purple
93-7-26-1-1n	compact	brown	100	2.0	38.0	10.8	pale purple
93-7-27-1-7n-1	intermediate	brown	100	1.6	38.2	9.6	pale purple/purple
93-8-5-1b-1	compact	brown	60	1.6	37.8	10.4	pale purple
93-8-5-2-1-1	compact	pale brown	70	2.2	41.8	11.5	pale purple
93-8-7-1a-3	compact	brown	60	1.3	39.3	11.0	pale purple
93-8-7-1a-6	compact	pale brown	100	2.0	45.0	11.6	pale purple/reddish purple
93-8-14-1-2-1	compact	dark brown	80	2.6	30.6	7.4	pale purple
93-8-14-1-2-2	compact	brown	90	1.2	40.0	10.8	pale purple
93-8-14-1-3-1	compact	brown	40	1.8	36.5	10.3	pale purple
B type							
93-7-6-1b-3-1	sparse	pale brown	70	2.4	39.2	11.4	purple
93-7-13-2-1	sparse	pale brown	100	2.6	41.0	12.2	purple
93-7-15-1-4-1	sparse	pale brown	100	2.2	40.6	10.8	pale purple/purple
93-7-15-1-4-2	sparse	gray	100	3.5	40.8	11.5	purple
93-7-27-1-1n-1	sparse	pale brown	100	2.6	39.3	10.8	purple
93-7-27-1-1n-2	sparse	gray	100	3.0	42.4	10.2	purple
93-7-27-1-7n-2	sparse	gray	100	3.4	32.8	7.6	reddish purple/pale purple
93-8-2-1-1-1	intermediate	pale brown	100	2.0	46.0	12.0	pale purple
93-8-2-1-1-2	intermediate	brown	100	1.8	44.0	10.6	pale purple
93-8-2-1-1-3	sparse	gray	80	2.2	44.0	11.2	pale purple
93-8-2-1-2	intermediate	pale brown	70	2.2	45.8	12.8	pale purple
93-8-5-2-1-2	sparse	gray	60	3.6	42.4	11.2	purple
93-8-7-1a-5-1	sparse	pale brown	100	2.5	38.0	10.8	pale purple
93-8-7-1a-5-2	intermediate	gray	100	1.8	42.4	11.4	pale purple
93-8-7-1b-1-1	sparse	pale brown	100	2.8	45.0	10.6	pale purple/purple
93-8-7-1b-1-2	sparse	gray	100	2.2	45.6	11.4	purple/pale purple
93-8-7-1d	sparse	pale brown	100	2.6	43.2	11.4	pale purple/purple
93-8-14-1-3-2	sparse	dark brown	30	2.5	34.0	9.5	pale purple/purple
C type							
93-6-29-2-15-2	small sparse	gray	40	3.5	26.0	6.0	pale purple
93-7-7-1b-1-2	small sparse	gray	90	3.0	27.8	5.8	pale purple
93-7-13-2-3-2	small sparse	gray	40	2.0	32.0	9.0	pale purple
93-8-14-1-1	small	dark brown	100	2.8	29.4	6.0	pale purple

Education, Tokyo Gakugei University, so as to compare their characteristics. These seeds (10 grains of each accession) were sown in a nursery box with sterilized soil on July 10, 1995. The seedlings were transplanted to the beds in the greenhouse on July 20. The five individuals and the others grew under row-to-row spacing of 15 cm and plant-to-plant spacing of 14 cm. The chemical fertilizer (N:P:K=16:10:14) was supplied at 50 g per m^2.

Several characteristics of proso millet are shown in Table 2. Generally, the panicle form is classified into three types, A, compact; B, sparse; C, small sparse, but it displayed remarkable variation in detail. Lemma color was divided into four grades, that is, pale brown, brown, dark brown and gray. The seed germination rate was mostly good at over 60 %, except for 5 accessions. The number of tillers varied from 1.0 to 3.6 on average. The flowering date was mostly short, ranging from 26.0 to 46.0 days. The number of leaves on the main culm was mostly small ranging from 5.8 to 12.2. Stigma color was dividable into three grades, pale purple, purple and reddish purple.

Most of A type with the compact panicle had brown lemma, a few tillers, a middle flowering date and a pale purple stigma. B type with sparse panicles had a pale brown or gray lemma, relatively more tillers, a middle flowering date and a purple stigma. B type resembled the landraces of Hokkaido (North Japan) in panicle form, number of tillers, flowering date, number of leaves and stigma color. These are very important characteristics for considering any northern dispersal route into Japan. C type with small sparse panicles was an associated mimic weed (*P. miliaceum* ssp. *ruderale* (Kitag.) Tzvelev) and had grayish lemma, relatively more tillers, early flowering date, fewer leaves on the main culm and a pale purple stigma. C type also showed a remarkable shattering and deep dormancy of seeds. These are typical traits of weedy plants. These data support the possibility that West Turkestan was the domestication center of proso millet, and that the weed (*P. miliaceum* ssp. *ruderale*) may be an ancestor of proso millet.

The seed germination rate of foxtail millet (3 accessions) was 100 %, but that of *S. viridis* and *Echinochloa* sp. (each one accession mixed together with proso millet seeds) was low, at 50 and 20 % as a weedy trait. The two landraces of foxtail millet had few tillers, while another mixed with proso millet seeds had many tillers. The former was higher which showed the ancestorlike characteristics of *S. viridis*. It is noteworthy that an ancestorlike landrace grew by mixing together with B type of proso millet, because the fact may also indicate that this area was a domestication center of foxtail millet.

The accessions of sorghum (52) were grown in order to compare their characteristics. These seeds (10 grains per accession) were sown in individual polyethylene pots (9 cm in diameter) with sterilized soil on May 3, 1994. The seedlings were transplanted to the experimental field on May 16. The five individuals and the others grew under row-to-row spacing of 100 cm and plant-to-plant spacing of 30 cm. The chemical fertilizer (N:P:K=16:10:14) was supplied 100 g per m^2. Several characteristics of sorghum are shown in Table 3. Those accessions were classified into five types, according to panicle form. The broom type (15 accessions) was a broom sorghum. This type was grown in kitchen gardens everywhere in West Turkestan and was an excellent material for making brooms because of the long sparse panicle

Table 3. Several characteristics of sorghum (*Sorghum bicolor*) cultivated in Tokyo, Japan

Collection No.	Panicle length (cm)	Lemma color	No. of tillers	Flowering date (days)	Plant height (cm)	Flag leaf (cm) length	Flag leaf (cm) width	Stigma color
I Broom type with broomlike panicle								
93-6-24-1-25	54.2	reddish brown	3	98	261	71	12.1	
93-6-26-1c-4	63.2	reddish brown	2.2	98.2	304.6	70.4	11.6	
93-6-27-3-4k	76.5		1.8	98.0	231.3	68.1	11.2	
93-6-28-1-11	60		2.4	109	273	62	8.7	
93-6-29-2-2	83.1	reddish brown	1.8	96.0	274.9	76.4	11.2	yellow
93-6-30-1a-5	74.2	reddish brown	2.2	93.2	393.2	75.5	9.1	yellow
93-6-30-1b-5	72.9		2.4	98.5	358.5	70.5	10.4	
93-7-2-1-1	81.5	reddish brown	2.2	96.5	273.4	66.9	11.0	yellow
93-7-6-1a-9	74.3	reddish brown	1.2	95.3	262.0	75.2	11.9	
93-7-8-3-1	74.7	reddish brown	2.0	90.3	204.0	69.2	11.0	yellow
93-7-9-1b-1	77.4	reddish brown	2.2	94.3	284.3	73.3	12.0	
93-7-11-0-1	67.5	reddish brown	2.0	99.4	391.2	81.1	11.0	
93-8-5-1b-2	72.7		1.6	96.6	303.0	70.2	10.5	
93-8-7-1b-4	76.3	reddish brown	2.4	94.4	318.8	78.0	11.3	yellow
93-8-13	61.4	reddish brown	2.2	102.2	406.2	73.2	10.7	
II Weed type with sparse panicle								
93-7-7-1a-1	38.2	black	3.6	81.8	250.1	53.6	5.0	reddish brown
93-7-7-1b-5	34.2	black	2.2	88.6	297.1	55.4	6.1	yellow
93-7-8-3-3	48.3	dark brown	4.4	96.8	352.3	64.7	4.9	white
III Sugar A type with conical panicle								
93-7-11-0-4	33.6	black	3.8	81.8	233.0	48.0	5.0	reddish brown
93-7-15-2-1	25.3	pale brown	2.0	85.5	158.7	52.2	4.6	yellow
93-7-15-2-2	24.6	black	2.6	86.8	278.6	45.2	7.0	white
93-7-15-2-8	36.2	reddish brown/ black	3.2	90.4	311.9	53.0	8.0	yellow
93-7-15-2-9	39.1	reddish brown	3.0	87.0	324.7	47.5	7.5	pale brown
93-7-15-2-14	30.3	black	3.6	84.2	251.4	48.6	6.7	white
93-7-15-2-20	39.2	black	3.4	90.4	304.7	53.9	6.8	yellow
IV Sugar B type with spearlike panicle								
93-7-8-3-4	29.2	brown	2.0	91.0	262.2	42.0	5.1	yellow
93-7-15-2-3	21.6	reddish black	3.4	89.4	236.4	36.3	5.7	white
93-7-15-2-5	25.6	reddish brown	2.6	89.0	219.0	38.1	7.1	yellow
93-7-15-2-6	36.2	dark brown	2.6	93.5	369.6	56.4	6.4	pale brown
93-7-15-2-7	32.8	reddish brown	3.4	97.2	348.4	50.0	7.3	white
93-7-15-2-10	24.6	black	2.6	146.0	335.2	36.7	4.4	
93-7-15-2-13	19.7	purplish black	2.2	99.0	261.2	37.2	6.0	yellow
93-7-15-2-15	28.0	reddish brown	2.4	91.4	253.9	40.5	6.3	white
93-7-15-2-17	29.6	pale brown/red	1.0	108.3	330.0	44.5	8.9	
93-7-15-2-18	27.4	reddish brown	3.8	82.2	273.4	63.8	6.1	yellow
93-7-15-2-19	31.7	brown	2.2	145.0	357.6	32.6	4.7	yellow
93-7-15-2-4	22.8		4.2	85.8	232.7	40.7	6.5	white
93-7-15-2-11	23.3	brown	1.3	90.0	146.1	59.2	9.1	white
93-7-15-2-12	29.4	reddish brown	2.8	104.4	412.8	52.3	10.6	yellow

Continued

Collection No.	Panicle length (cm)	Lemma color	No. of tillers	Flowering date (days)	Plant height (cm)	Flag leaf (cm) length	Flag leaf (cm) width	Stigma color
V Grain type with drooping ovate-compact panicle								
93-7-9-1b-2	12.7		1.0	111.5	334.0	39.8	7.8	white
93-7-9-1b-3-4	11.5		1.0	100.8	334.5	38.7	7.0	white
93-7-9-1b-8	14.7		2.0	105.6				white
93-7-10-2	14.6	black	1.8	96.6	356.0	39.8	7.4	white
93-7-11-0-3	15.6		1.4	101.8	334.6	46.9	8.7	white
93-8-2-1-3	16.4		1.4	99.3	276.0	54.5	9.7	white
93-8-5-2-4	11.7		1.2	108.0	328.9	37.5	6.2	white
93-7-11-1-5	15.5		1.2	104.8	350.5	45.0	7.7	white
93-7-13-2-2	13.9		1.0	96.4	340.3	45.0	8.1	white
93-7-15-1-1	16.0	black/reddish brown	1.8	94.3	219.7	47.0	8.5	white
Undicided								
93-7-8-1-4				92.0				
93-7-8-3-2			1					
93-7-15-2-16	39.4		3.2	97.2	318.1	50.3	6.2	yellow

(about 70 cm). The brooms were also sold in many bazaars. Only plant height had a large variation from 200 to 400 cm on average, the other characteristics being small in variation, as follows. The length and width of flag leaves were about 70 cm and 11 cm, respectively. The flowering date was medium ranging from 90 to 100 days. Stigma color was yellow and lemma color reddish brown. The weedy type (3) had a sparse panicle with many tillers. Plant height was 250 to 350 cm. Panicle length was about 40cm. The length and width of flag leaf were about 40 cm and 5 cm, respectively. The flowering date was 80 to 100 days. The sugar A type (7) had conical panicles and a large variation as follows. Panicle length was from 25 to 40 cm. The number of tillers was between 2 and 4. Plant height was from 150 to 324 cm. The length and width of flag leaf were about 50 cm and 5 to 8 cm, respectively. Flowering date was early from 80 to 90 days. The sugar B type (14) had a spearlike panicle. The number of tillers was between 1 and 4. Plant height was from 150 to 410 cm. Panicle length was from 20 to 36 cm. The length and width of flag leaf were from 33 to 64 cm and from 5 to 11 cm, respectively. Flowering date was from 82 to 146 days. Stigma color was white or yellow. Both sugar A and B types were sugar sorghum varieties maintained for the genetic resources of sugar production at Leningrad University. The grain type (10) had a drooping ovate-compact panicle and few tillers. Plant height was about 220 to 360 cm. Panicle length was short ranging from 12 to 16 cm. The length and width of flag leaf were from 38 to 55 cm and from 6 to 10 cm, respectively. The flowering date was about 96 to 112 days. Stigma color was white, and lemma color mostly black. This type showed an evenness and small variability and was consumed as a food grain in Uzbekistan. Broom type, sugar A and B types were identified with *Sorghum bicolor* var.

Table 4. Germination rate and heading date of tribe Triticeae and genus *Avena* plants in Tokyo, Japan

Collection No.	Species name	Germination rate (%)	Heading date (days)
93-6-23-2-3	*Aegilops cylindrica* var. *typica*	100	May 22 (191.9)
93-6-24-0-2	*Ae. triuncialis* ssp. *eu-triuncialis* var. *typica*	100	May 24 (194.4)
93-6-24-3-4	*Ae. squarrosa* ssp. *eusquarrosa* var. *typica*	100	May 15 (185.2)
93-6-24-3-5	*Ae. crassa* var. *typica* (or var. *macrathera*)	100	May 26 (196.2)
93-6-24-2-8	*Ae. crassa* var. *macrathera*	100	May 22 (191.6)
93-6-25-2-4	*Ae. cylindrica* var. *pauciaristata*	60	May 27 (196.6)
93-6-27-1-1	Natural hybrid *Triticum aestivum* x *Aegilops* sp. (Grew with *Ae. cylindrica* var. *typica* or *Ae. triuncialis*)	0	
93-7-9-1-5k-1	Natural hybrid *Triticum aestivum* x *Aegilops* sp.	0	
93-7-9-1-5k-2	*Ae. cylindrica* var. *typica* (Sympatrically with a natural hybrid)	100	May 18 (188.3)
93-6-23-1-4	*Hordeum spontaneum*	70	May 19 (188.9)
93-6-23-2-8	*H. vulgare* (six rows)	100	May 29 (199.4)
93-6-29-1a-2	*H. vulgare* (two rows)	100	May 6 (176.1)
93-7-12-1-2-1	*H. vulgare* (six rows)	80	May 30 (200.4)
93-7-12-1-2-2	*H. vulgare* (two rows)	80	May 16 (185.7)
93-7-14-3-1	*H. spontaneum*	80	May 18 (188.1)
93-6-24-3-1	*Triticum aestivum*	90	May 14 (184.3)
93-7-11-1-6	*T. aestivum*	100	May 14 (184.0)
93-6-29-4-2	*Secale cereale*	100	May 24 (194.1)
93-7-8-1-1	*Triticale*	90	May 6 (176.2)
93-7-8-1-5	*Avena* sp.	100	June 12 (212.9)
93-8-10-5-4	*Avena* sp.	70	June 7 (207.7)

bicolor (bicolor group), weedy type with *S. bicolor* var. *dummondii*, and grain type with *S. bicolor* var. *bicolor* (durra group). The sugar types were frequently attacked and eaten by birds. The dense panicle of the grain type was infected with fungi in rainy September.

The accessions of tribe Triticeae (19) and genus *Avena* (2) were cultivated at the same time in Koganei, Tokyo. These seeds (10 grains each) were sown in a growing box with sterilized soil on November 11, 1994. The seedlings were transplanted to the experimental field on December 4. The individuals grew under plant-to-plant spacing of 30 cm and row-to-row spacing of 100 cm. The chemical fertilizer (N:P:K=16:10:14) was supplied at 113 g per m^2 in total. Those scientific names were identified in detail by Plant Germ-Plasm Institute, Kyoto University. The seed germination rates were very good except for two natural hybrids, as shown in Table 4. The three *Aegilops* species showed sometimes twin seedlings in germinating. This heading date was mainly in the middle or the end of May, but one of barley and *Triticale* was early in the beginning of May and two *Avena* species were late in June. They did not grow well during the rainy season in June and July.

Utilization of millets and other cereals

Nomadic people is in the Steppe grasslands and the residential people at oases have since ancient

Table 5. Vernacular names of cereal cooking in West Turkestan

Russian name	Uzbekistan	Kazakhstan	Kirghistan	Turkmenistan
I Foods				
A Grain				
плов	ош	ош, пилав	плов	плов
—	мастава			
—	шобла			
—	гужа	гужа		
B Meal				
каша	каша	каша, гризл	каша	
C Flour				
хлеб	хлеб	хлеб		
нон	нон	нон, нан	нон, нан	ноң, снияек
—	катлама			
блины		блины		блины
пирог	пирог			
—	самса	самса		самса
—	манты			манты
пельмени	чучвара, барг	кобуш, куиок	чучвара	
лапша	лагман		бесме	лапша
макароны	макороны			
—	тулкон	тулконы		
—	холваитар			
II Drinks				
квас	квас	квас	жармак, максим	квас
пива	пиво	пиво, сыра	пиво	

times constructed their culture complex in West Turkestan. However, this area has undergone the cultural impacts of many historical events, especially Islamisation in the 10th century and Communism in the 20th century. The people have accepted many sorts of culture complex and modified them into a comfortable style under severe natural and historical conditions. Here was the real crossroads of culture complexes from Africa, Europe and Asia.

The people must have originally established their food culture and life style under the influence of many different culture complexes. The cereals, particularly, were used as the ingredients for staple foods (АБДРАХМАНОВИЧ, 1990). They prepared many dishes and called them by vernacular names, as shown in Table 5. Cereal cooking was classified two categories: food and drink. The former was divided three types, grain, meal and flour. The grain type contained four foods, that is, pilaf (ош or плов), gruel mixed with vegetables (мастава), tender pilaf (шобла) and milky soup with grains (гужа). The meal type had only one item, porridge boiled with milk or water (каша or гриэл). From flour 12 foods were made as follows. These were modern bread (хлеб), traditional bread (нон or нияек), thin bread like Indian *chapati* (катлама), a bread stuffed with meat and vegetables (пирог), crepe

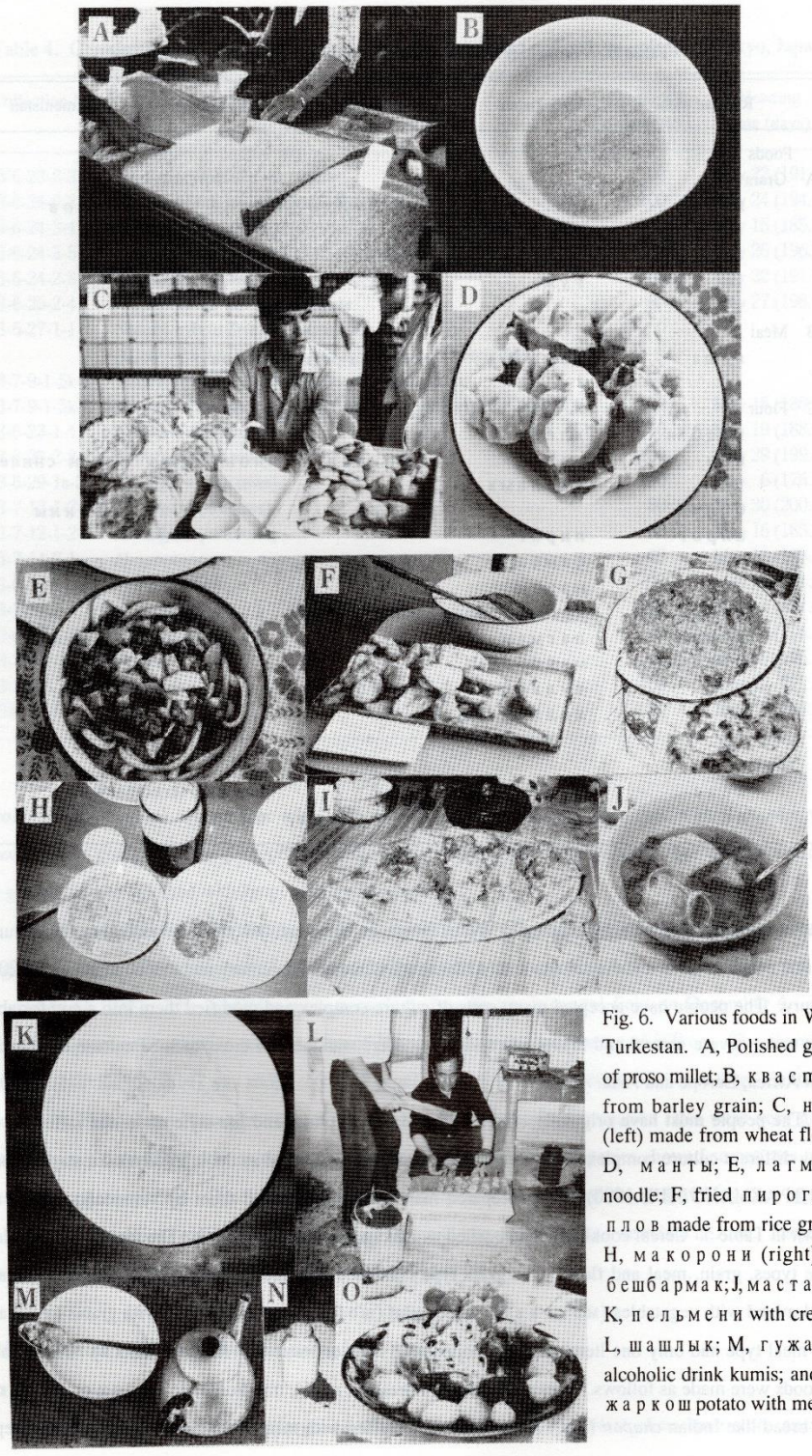

Fig. 6. Various foods in West Turkestan. A, Polished grain of proso millet; B, квас made from barley grain; C, нон (left) made from wheat flour; D, манты; E, лагман noodle; F, fried пирог; G, плов made from rice grain; H, макорони (right); I, бешбармак; J, мастава; K, пельмени with cream; L, шашлык; M, гужа; N, alcoholic drink kumis; and O, жаркош potato with meat.

(блины), pelmeni as a dumpling with minced mutton and vegetable stuffing (чучвара, кобуш, барг or куиок), noodles (лагман, бесме or лапша), macaroni (макороны), Indian *samosa* (самса), Chinese *manto* as a bun with minced mutton or beef filling (манты), flour gruel mixed milk tea (тулон or тулконы), and soup with roasted flour (холваитар). There were two drinks, a weak alcoholic kvass (квас, жармак or максим) and another beer (пиво or сыра). It is interesting that these vernacular names and cooking manners reveal their origins and dispersal routes, for example, the traditional bread and *samosa* were related to the Indian Subcontinent, while the noodles and *manto* were cognate with China.

In Uzbekistan, wheat was mostly used for preparing eight foods, as shown in Table 6. From proso millet six foods were made, that is, gruel, tender pilaf, porridge, milky soup with grains, traditional bread and flour gruel with milk tea. From sorghum five foods were prepared: pilaf, porridge, milky soup with grains, bread and flour gruel with milk tea. On the other hand, traditional bread was made from five ingredients and porridge from four. In Kazakhstan wheat was mainly used for seven foods, as shown in Table 7. Three foods, porridge, bread and flour gruel, were made from proso millet and only one, milky soup with grains from sorghum. Porridge was made from proso millet, rice and buckwheat. Traditional bread was made from proso millet, wheat and buckwheat. Foxtail millet was not used for food in either country, but only as bird feed. The grain and meal types of foods were prepared mostly from proso millet, sorghum and rice. However, it is interesting that porridge was also made from barley and buckwheat, because this cooking is considered one of the oldest and most primitive techniques. The traditional porridge made from proso millet was dispersed from Turkestan to Europe in Eurasia. The technique of porridge cooking may have dispersed by nomads together with proso millet from Central Asia westwards in ancient times. Pilaf made from rice may have dispersed too from Turkestan to Southern Europe.

Table 6. Cereal cooking and their ingredients in Uzbekistan

Cooking / Ingredient	ош	мастаа	шрбла	гужа	каша	хлеб	нон	пирог	самса	манты	лагман	кобуш	макороны	тулконы	квас	сыра	Total
Panicum miliaceum		△	△	△	○		△							△			6
Setaria italica																	0
Sorghum bicolor	○			△	○		○							○			5
Oryza sativa	○	○	△		○												4
Triticum aestivum						○	○	○	○	○	○	○		△			8
Tricum duram													○				1
Hordeum vulgare				○	○		○		△							○	5
Zea mays							△										1
Fagopyrum esculentum																	0
Total	2	2	2	3	4	1	5	1	2	1	1	1	1	3	0	1	30

○, frequently; △, sometimes.

Table 7. Cereal cooking and their ingredients in Kazakhstan

Cooking / Ingredient	ош	мастава	шубла	гужа	каша	хлеб	нон	пирог	самса	манты	лагман	чучвара	макароны	тулкон	квас	пиво	Total
Panicum miliaceum					○		△							○			3
Setaria italica																	0
Sorghum bicolor				○													1
Oryza sativa	○				○												2
Triticum aestivum				○		○	○	○	○		○	○					7
Tricum duram																	0
Hordeum vulgare						△									○	○	3
Zea mays																	0
Fagopyrum esculentum					○		△										2
Total	1	0	0	2	3	2	3	1	1	0	1	1	0	1	1	1	18

○, frequently; △, sometimes.

Table 8. Daily meal system in West Turkestan

	Uzbekistan	Kazakhstan	Kirghistan	Turkmenistan
Breakfast	5 a.m. in summer 7-8 a.m. in winter чаи, нон сут, нухот холваитар тулкон каша	5-6 a.m. in summer 7-8 a.m. in winter чаи, нон сут блины яичница	5 a.m. in summer 8 a.m. in winter чаи, нон сут жармак	чаи, нон
Lunch	11 a.m.- 1 p.m. in summer 1 p.m. in winter чаи, нон шурва, ош лагман	2 p.m. вшвармак soup with bread, rice and meat, чаи, самса лагман пирог	0 p.m. чаи, ош бесме бешбармак	чаи варенве суп-борш лагман кала снолва плов
Tea time			3-4 p.m. жармак	
Supper	7-8 p.m. in summer 5 p.m. in winter чаи, нон ош, лагман макорони жаркош салат	6-8 p.m. чаи, ош surpa with meat and vegetables, kumis, airak салам баурсек матнроуст	9 p.m. in summer 6-7 p.m. in winter чаи, ош бешбармак бесме жаркош слурпа	чаи, нон манты самса

The daily meal system of the four countries is shown in Table 8. Generally, the people ate bread and drank tea and milk at breakfast. Sometimes light foods were served, for example porridge, gruel or soup. Bread was eaten every meal, but pilaf and noodles were often eaten with salad and soup at lunch and dinner. Boiled potato mixed with mutton (жаркош) was eaten at dinner in Uzbekistan and Kirghistan. Beer was sold and drunken everywhere on roadsides and in shops in both places. Kvass was drunk at breakfast and afternoon in Kirghistan where the temperature was cool all year round because of the hills. Salad was made of tomato, onion and cucumber with some salt and pepper. A number of horses were fed in the Steppes of Kazakhstan. The people there drunk alcoholic drinks, kumis and airak made from the milk of horses and camels, respectively.

These cereals were used not only for foods and drinks but also for various daily needs. The polished grains of proso millet were stuffed into a baby's mat and their lemmas were also used in pillows. These mats and pillows promised a baby sound sleep in the hot season, because they absorb sweat and made a comfortable cushion against the body. Grains were also colored with red, green and blue dyes for using as a bread topping, and in very rare cases displayed in a modern-style picture. Foxtail millet was mainly used as bird feed. Brooms were made of sorghum panicles. The leaves and culms of millets and maize were good fodder for livestock, while those of wheat were used for building houses as a material mixed with mud.

This expedition offered research in the weed-crop complex of millets and other cereals (de Wet and Harlan, 1975), the geographical variation of proso millet (Лысов, 1968) and the diversity of cereal cookery in both West and East Turkestan. At the next opportunity, these comparative studies will be advanced in collaboration between Uzbekistan and Japan.

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Appendix Plant samples collected in West Turkestan

Collection no.	Scientific name	Locality (altitude)
93-6-19-1-1	*Robinia* sp.	roadside, Moscow
93-6-19-1-2	*Taraxacum officinalis*	roadside, Moscow
93-6-19-3	*Rorippa islandica*	garden pot, Moscow
93-6-21-1	*Taraxacum* sp.	roadside, Tashkent, Uzbekistan
93-6-21-2	*Hordeum* sp.	roadside, Tashkent, Uzbekistan
93-6-23-1-1	*Triticum aestivum*	37km from Tashkent to Chimkent (457m)
93-6-23-1-2	*Triticum aestivum*	Kazakhstan
93-6-23-1-3	*Hordeum vurgare* (six-rowed)	
93-6-23-1-4	*Hordeum spontaneum*	
93-6-23-1-5	Gramineae (weed)	
93-6-23-1-6	*Hordeum* sp. (wild)	
93-6-23-1-7	*Vicia* sp.	
93-6-23-1-8	*Galium* sp.	
93-6-23-1-9	*Rumex* sp.	
93-6-23-2-1	*Avena* sp. (weed)	96km from Tashkent to Chimkent (480m)
93-6-23-2-2	*Hordeum spontaneum*	Kazakhstan
93-6-23-2-3	*Aegilops cylindrica* var. *typica*	
93-6-23-2-4	*Vicia* sp. (weed)	
93-6-23-2-5	*Hordeum* sp. (weed)	
93-6-23-2-6	*Hordeum* sp. (wild)	
93-6-23-2-7	*Hordeum* sp. (wild)	
93-6-23-2-8	*Hordeum vulgale* (six-rowed)	
93-6-24-0-1	*Aegilops cylindrica* var. *typica*	115km from Tashkent to Chimkent (411m)
93-6-24-0-2	*Aegilops triuncialis* ssp. *eu-triuncials* var. *typica*	Kazakhstan
93-6-24-0-3	*Hordeum* sp. (wild)	
93-6-24-0-4	*Hordeum vulgale* (six-rowed)	
93-6-24-0-5	*Lolium* sp.	
93-6-24-1-1	*Lycopersicon esculentum*	Seed shop, Chimkent bazaar (413m)
93-6-24-1-2	*Citrullus battich*	Kazakhstan
93-6-24-1-3	*Brassica* sp.	
93-6-24-1-4	unknown	
93-6-24-1-5	*Citrullus battich*	
93-6-24-1-6	*Cucurbita* sp.	
93-6-24-1-7	unknown	
93-6-24-1-8	unknown	
93-6-24-1-9	unknown	
93-6-24-1-10	*Cucumis sativus*	
93-6-24-1-11	*Cucumis sativus*	
93-6-24-1-12	*Capsicum annuum*	
93-6-24-1-13	*Brassica* sp.	

Collection no.	Scientific name	Locality (altitude)
93-6-24-1-14	*Daucus carota*	Seed Shop, Chimkent bazaar (413m)
93-6-24-1-15	*Spinacia oleracea*	Kazakhstan
93-6-24-1-16	*Piper nigrum*	
93-6-24-1-17	*Cucumis sativus*	
93-6-24-1-18	*Zea mays*	
93-6-24-1-19	*Allium fistulosum*	
93-6-24-1-20	*Brassica* sp.	
93-6-24-1-21	undicided	
93-6-24-1-22	*Brassica* sp.	
93-6-24-1-23	unknown	
93-6-24-1-24	*Allium cepa*	
93-6-24-1-25	*Sorghum bicolor*	
93-6-24-1-26	*Anethum graveolens*	
93-6-24-1-27	*Solanum melongena*	
93-6-24-1-28	*Cucurbita* sp.	
93-6-24-2-1	*Aegilops cylindrica* var. *typica*	51km from Chimkent to Tashkent (229m)
93-6-24-2-2	*Hordeum* sp. (wild)	Kazakhstan
93-6-24-2-3	*Aegilops cylindrica* var. *typica*	
93-6-24-3-1	*Triticum aestivum*	61km from Chimkent to Turkestan (315m)
93-6-24-3-2	*Hordeum vulgare* (two-rowed)	Kazakhstan
93-6-24-3-3	*Triticum aestivum*	
93-6-24-3-4	*Aegilops squarrosa* ssp. *eusquarrosa* var. *typica*	
93-6-24-3-5	*Aegilops crassa* var. *typica* (or *macrathera*)	
93-6-24-3-6	*Aegilops cylindrica* var. *typica*	
93-6-24-3-7	*Aegilops crassa* var. *macrathera* (or *typica*)	
93-6-24-3-8	*Aegilops crassa* var. *macrathera*	
93-6-24-3-9	Gramineae (weed)	
93-6-24-3-10	undicided	
93-6-25-1-1a	*Aegilops cylindrica* var. *typica*	60km before Turkestan (208m), Kazakhstan
93-6-25-1-1b	*Aegilops squarrosa* ssp. *eusquarrosa* var. *typica*	
93-6-25-1-2	*Hordeum* sp.	
93-6-25-1-3	Gramineae (weed)	
93-6-25-1-4	Gramineae (weed)	
93-6-25-1-5	*Agropyron repens*	
93-6-25-1-6	Paniceae (weed)	
93-6-25-2-1	*Avena* sp. (weed)	(200m)
93-6-25-2-2	*Triticum aestivum*	
93-6-25-2-3	*Aegilops cylindrica* var. *typica*, var. *pauciaristata* mixed	
93-6-25-2-4a	*Aegilops crassa* var. *macrathera*	
93-6-25-2-4b	*Aegilops cylindrica* var. *pauciaristata*	

Collection no.	Scientific name	Locality (altitude)
93-6-25-2-5	*Taeniatherum asperum*	
93-6-25-2-6	*Aegilops cylindrica* var. *typica*	
93-6-25-2-7	*Triticum aestivum*	
93-6-25-3-1	*Avena* sp.	(205m)
93-6-25-3-2	*Agropyron* sp.	
93-6-26-1a-1	*Zea mays*	Central market, Turkestan, Kazakhstan
93-6-26-1a-2	*Triticum aestivum*	
93-6-26-1a-3	*Panicum miliaceum*	
93-6-26-1a-4	*Zea mays*	
93-6-26-1b	*Coix lacryma-jobi* var. *lacryma-jobi*	
93-6-26-1c-1	*Cucumis melo*	
93-6-26-1c-2	*Cucumis melo*	
93-6-26-1c-3	*Cucumis melo*	
93-6-26-1c-4	*Sorghum bicolor*	
93-6-26-1c-5	*Cucurbita* sp.	
93-6-26-1c-6	*Medicago sativa*	
93-6-26-1c-7	*Cucumis melo*	
93-6-26-1c-8	*Cucumis melo*	
93-6-26-2	*Setaria viridis*	Timur Mosk, Turkestan, Kazakhstan
93-6-27-0-1	*Setaria viridis*	Turkestan (210m), Kazakhstan
93-6-27-0-2	*Echinochloa* sp.	
93-6-27-1	Natural hybrid between *T. aestivum* and *Aegilops*	65km from Turkestan to Karatau (428m)
93-6-27-2-1	*Triticum aestivum*	32km from Kentau to Karatau, Kazakhstan
93-6-27-2-2	*Triticum aestivum*	
93-6-27-2-3	*Triticum aestivum*	
93-6-27-2-4	*Aegilops cylindrica* var. *typica*	
93-6-27-2-5	*Triticum aestivum*	
93-6-27-2-6	*Agropyron* sp.	
93-6-27-2-7	*Aegilops triuncialis* ssp. *eu-triuncialis* var. *typica*	
93-6-27-2-8	*Taeniatherum asperum*	
93-6-27-3-1	*Aegilops cylindrica* var. *typica*	(600m)
93-6-27-3-2	*Aegilops triuncialis* ssp. *eu-triuncialis* var. *typica*	
93-6-27-4-1	*Aegilops triuncialis* ssp. *eu-triuncialis* var. *typica*	
93-6-27-4-2	*Aegilops cylindrica* var. *typica*, var. *pauciaristata* mixed	
93-6-27-4-3	Gramineae	
93-6-28-0-1	*Aegilops cylindrica* var. *typica*	Karatau (491m), Kazakhstan
93-6-28-0-2	*Lolium* sp.	
93-6-28-0-3	*Agropyron cristaum*	
93-6-28-1-1	*Spinacia oleracea*	Bazaar, Karatau, Kazakhstan
93-6-28-1-2	*Petroselium sativum*	

Collection no.	Scientific name	Locality (altitude)
93-6-28-1-3	*Helianthus annuus*	Bazaar, Karatau, Kazakhstan
93-6-28-1-4	*Brassica* sp.	
93-6-28-1-5	*Coriandrum sativum*	
93-6-28-1-6	*Lycopersicon esculentum*	
93-6-28-1-7	*Brassica* sp.	
93-6-28-1-8	*Cucumis melo*	
93-6-28-1-9	*Anethum graveolens*	
93-6-28-1-10	*Mirabilis jalapa*	
93-6-28-1-11	*Sorghum bicolor*	
93-6-28-1-12	*Cucumis melo*	
93-6-28-1-13	*Citrullus battich*	
93-6-28-1-14	*Cucumis sativus*	Bazaar, Karatau, Kazakhstan
93-6-29-1a-1	*Hordeum vulgare* (two-rowed)	10km before Dzhambul (518m), Kazakhstan
93-6-29-1a-2	*Hordeum vulgare* (two-rowed)	
93-6-29-1a-3	*Hordeum vulgare* (six-rowed)	
93-6-29-1b-1	*Triticum aestivum*	
93-6-29-1b-2	*Hordeum* sp.	
93-6-29-1b-3	*Hordeum vulgare* (two-rowed)	
93-6-29-1b-4	*Aegilops cylindrica* var. *typica*, var. *pauciaristata* mixed	
93-6-29-1b-5	*Aegilops cylindrica* var. *pauciatristata*	
93-6-29-1c	*Agropyron* sp.	
93-6-29-2-1	spice, Umbelliferae	Central market, Dzhambul (591m)
93-6-29-2-2	*Sorghum bicolor*	Kazakhstan
93-6-29-2-3	unknown	
93-6-29-2-4	*Coriandrum sativum*	
93-6-29-2-5	*Sesamum indicum*	
93-6-29-2-6	legume	
93-6-29-2-7	*Helianthus annuus*	
93-6-29-2-8	*Cicer arietinum*	
93-6-29-2-9	legume	
93-6-29-2-10	*Cucumis sativus*	
93-6-29-2-11	legume	
93-6-29-2-12	*Ocimum basilicum*	
93-6-29-2-13	*Citrullus battich*	
93-6-29-2-14	*Lycopersicon esculentum*	
93-6-29-2-15	*Panicum miliaceum*	
93-6-29-2-16	*Zea mays*	
93-6-29-2-17	*Coriandrum sativum*	
93-6-29-2-18	legume	
93-6-29-3-1	*Secale cereale*	48km from Dzhambul (567m), Kazakhstan

Collection no.	Scientific name	Locality (altitude)
93-6-29-3-2a	*Aegilops cylindrica* var. *typica*	
93-6-29-3-2b	*Aegilops squarrosa* ssp. *eusquarrosa* var. *typica*	
93-6-29-4-1	*Triticum aestivum*	61km from Dzhambul (605m), Kazakhstan
93-6-29-4-2	*Secale cereale*	
93-6-29-4-3	*Agropyron* sp.	
93-6-29-4-4	*Aegilops cylindrica* var. *typica*	
93-6-30-1a-1	*Daucus carota*	Central bazaar, Bishkek (714m), Kirghistan
93-6-30-1a-2	Compositae	
93-6-30-1a-3	Cucurbitaceae	
93-6-30-1a-4	*Lagenaria leucantha*	
93-6-30-1a-5	*Sorghum bicolor*	
93-6-30-1a-6	*Allium cepa*	
93-6-30-1b-1	*Capsicum annuum*	
93-6-30-1b-2	*Spinacia oleracea*	
93-6-30-1b-3	*Pimpinella anisum*	
93-6-30-1b-4	*Brassica* sp.	
93-6-30-1b-5	*Sorghum bicolor*	
93-6-30-1b-6	*Allium cepa*	
93-6-30-1b-7	*Cucumis sativus*	
93-6-30-1b-8	*Brassica* sp.	
93-6-30-1b-9	*Cucumis sativus*	
93-6-30-1b-10	*Anethum graveolens*	
93-6-30-1b-11	*Cucumis melo*	
93-6-30-1b-12	*Perilla frutescens*	
93-6-30-1b-13	*Cucumis sativus*	
93-6-30-1b-14	*Brassica* sp.	
93-6-30-1b-15	*Elettaria cardamomum*	
93-6-30-1b-16	*Citrullus battich*	
93-6-30-1b-17	*Lycopersicon esculentum*	
93-6-30-1b-18	*Ocimum basilicum*	
93-6-30-1b-19	*Allium* sp.	
93-6-30-1b-20	*Capsicum annuum*	
93-6-30-1b-21	*Capsicum annuum*	
93-6-30-1b-22	*Coriandrum sativum*	
93-6-30-1b-23	legume	
93-6-30-1b-24	*Brassica* sp.	
93-7-1-1-1	*Typha angustata*	77km from Bishkek to Dzhambul (692m)
93-7-1-1-2	*Triticum aestivum*	77km from Bishkek, Kazakhstan
93-7-1-2	*Taraxacum* sp.	130km from Bishkek (1,198m), Kazakhstan
93-7-2-1	*Sorghum bicolor*	Market, Dzhanbul bazaar (611m), Kazkhstan

Collection no.	Scientific name	Locality (altitude)
93-7-2-2-1	*Panicum miliaceum*	33km before Tashkent (561m), Kazakhstan
93-7-2-2-2	*Setaria viridis*	
93-7-2-2-3	*Echinochloa* sp.	
93-7-5-1-1	*Lolium* sp.	Leninabad (321m), Tajikistan
93-7-5-1-2	*Echinochloa* sp.	
93-7-5-1-3	*Echinochloa* sp.	
93-7-6-1a-1	*Lycopersicon esculentum*	Leninabad bazaar, Tajikistan
93-7-6-1a-2	*Cucumis sativus*	
93-7-6-1a-3	*Allium cepa*	
93-7-6-1a-4	*Sesamum indicum*	
93-7-6-1a-5	*Allium cepa*	
93-7-6-1a-6	*Capsicum annuum*	
93-7-6-1a-7	unknown	
93-7-6-1a-8	*Panicum miliaceum*	
93-7-6-1a-9	*Sorghum bicolor*	
93-7-6-1b-1	*Panicum miliaceum*	
93-7-6-1b-2	*Solanum melongena*	
93-7-6-1b-3	*Panicum miliaceum*	
93-7-6-1b-4	*Capsicum annuum*	
93-7-6-1b-5	*Capsicum annuum*	
93-7-6-1b-6	*Lycopersicon esculentum*	
93-7-6-1b-7	*Lycopersicon esculentum*	
93-7-6-1b-8	*Lycopersicon esculentum*	
93-7-6-1b-9	*Cucumis sativus*	
93-7-6-1b-10	*Cucumis sativus*	
93-7-6-1b-11	*Lycopersicon esculentum*	
93-7-6-1c-1	*Panicum miliaceum*	
93-7-6-1c-2	*Zea mays*	
93-7-6-1c-3	*Triticum aestivum;* threshed with *Secale cereale* mixed	
93-7-6-1c-4	*Zea mays*	
93-7-6-1c-5	*Zea mays*	
93-7-6-1c-6	*Hordeum vulgare;* threshed	
93-7-6-1c-7	*Triticum aestivum;* threshed with *Secale cereale* mixed	
93-7-6-1c-8	*Triticum aestivum* with *Hordeum vulgare;* threshed and *Secale cereale* mixed	
93-7-6-1c-9	*Triticum aestivum* with *Hordeum vulgare;* threshed	
93-7-6-1c-10	*Triticum aestivum;* threshed	
93-7-6-3-1	*Echinochloa* sp.	Kokand, Uzbekistan
93-7-6-3-2	*Amaranthus* sp.	
93-7-7-1a-1	*Sorghum bicolor*	Bazaar, Kokand (413m), Uzbekistan

Collection no.	Scientific name	Locality (altitude)
93-7-7-1a-2	***Oryza sativa***	**Bazaar, Kokand, Uzbekistan**
93-7-7-1b-1	***Panicum miliaceum***	
93-7-7-1b-2	***Sesamum indicum***	
93-7-7-1b-3	***Sesamum indicum***	
93-7-7-1b-4	***Medicago sativa***	
93-7-7-1b-5	***Sorghum*** sp.	
93-7-7-1b-6	***Brassica*** sp.	
93-7-7-3-1	unknown	
93-7-7-3-2	spice	
93-7-7-3-3	*Anethum graveolens*	
93-7-7-3-4	spice	
93-7-7-3-5	*Daucus carota*	
93-7-7-3-6	spice	
93-7-8-1-1	*Triticale*	9 km from Fergana to Osh (590m), Uzbekistan
93-7-8-1-2	*Triticum aestivum*	
93-7-8-1-3	*Triticum aestivum*	
93-7-8-1-4	*Sorghum* sp.	
93-7-8-1-5	*Avena* sp.	
93-7-8-1-6	*Setaria viridis*	
93-7-8-1-7	*Portulaca* sp.	
93-7-8-2-1	*Triticum aestivum*	15km from Fergana (572m), Uzbekistan
93-7-8-2-2	*Setaria viridis*	
93-7-8-2-3	*Echinochloa* sp.	
93-7-8-2-4	*Echinochloa* sp.	
93-7-8-2-5	*Sorghum* sp.	
93-7-8-3-1	*Sorghum bicolor*	Marhamat Bazaar, 45km before Osh
93-7-8-3-2	*Sorghum bicolor*	
93-7-8-3-3	*Sorghum bicolor*	
93-7-8-3-4	*Sorghum bicolor*	
93-7-9-0	*Taraxacum* sp.	123km from Fergana (650m), Uzbekistan
93-7-9-1a-1	*Lagenaria leucantha*	Bazaar, Andizhan (493m), Uzbekistan
93-7-9-1a-2	*Citrullus battich*	
93-7-9-1a-3	*Ricinus communis*	
93-7-9-1b-1	*Sorghum bicolor*	
93-7-9-1b-2	*Sorghum bicolor*	
93-7-9-1b-3	***Panicum miliaceum***	
93-7-9-1b-4	**legume**	
93-7-9-1b-5	**legume**	
93-7-9-1b-6	***Zea mays***	
93-7-9-1b-7	***Zea mays***	

Collection no.	Scientific name	Locality (altitude)
93-7-9-1b-8	*Sorghum bicolor*	
93-7-10-1-1	*Echinochloa* sp.	70km from Andizhan (431m), Uzbekistan
93-7-10-1-2	*Setaria viridis*	
93-7-10-2	*Sorghum bicolor*	Bazaar, Namangan (416m), Uzbekistan
93-7-10-3	*Echinochloa* sp.	
93-7-11-4-1	*Setaria italica*	6km from Bubaida, Uzbekistan
93-7-11-4-2	*Oryza sativa*	
93-7-11-4-3	legume	
93-7-11-0-1	*Sorghum bicolor*	Bazaar, 6km from Bubaida, Uzbekistan
93-7-11-0-2	*Zea mays*	
93-7-11-0-3	*Sorghum bicolor*	
93-7-11-0-4	*Sorghum* sp.	
93-7-11-0-5	*Setaria italica*	
93-7-11-1-1	*Zea mays*	
93-7-11-1-2	legume	
93-7-11-1-3	legume	
93-7-11-1-4	*Oryza sativa*	
93-7-11-1-5	*Sorghum bicolor*	
93-7-11-1-6	*Setaria italica*	
93-7-11-1-7	*Triticum aestivum;* threshed	
93-7-11-1-8	*Hordeum vulgare;* threshed	
93-7-12-0	*Avena* sp.	Angren (906m), Uzbekistan
93-7-12-1-1	*Echinochloa* sp.	157km from Angren (270m), Uzbekistan
93-7-12-1-2	*Hordeum vulgare* (six-rowed)	
93-7-13-1-1	*Triticum aestivum*	113km before Samarkand (490m), Uzbekistan
93-7-13-1-2	*Hordeum spontaneum*	
93-7-13-1-3	*Lolium* sp.	
93-7-13-2-1	*Panicum miliaceum*	Bazaar, Samarkand (708m), Uzbekistan
93-7-13-2-2	*Sorghum bicolor*	
93-7-13-2-3	*Panicum miliaceum*	
93-7-14-1-1	*Triticum aestivum*	(600m)
93-7-14-2	*Panicum miliaceum*	90km from Samarkand (511m), Uzbekistan
93-7-14-3-1	*Hordeum spontaneum*	34km before Katta-Kurgan (510m)
93-7-14-3-2	*Triticum aestivum*	
93-7-14-3-3	*Agropyron* sp.	
93-7-15-1-1	*Sorghum bicolor*	Sorghum Station, Katta-Kurgan (480m)
93-7-15-1-2	*Sesamum indicum*	Uzbekistan
93-7-15-1-3	*Sesamum indicum*	
93-7-15-1-4	*Panicum miliaceum*	
93-7-15-1-5	*Setaria viridis*	

Collection no.	Scientific name	Locality (altitude)
93-7-15-1-6	*Setaria glauca*	
93-7-15-1-7	*Echinochloa* sp.	
93-7-15-2-1	*Sorghum bicolor*	Collection from Mr. Oman
93-7-15-2-2	*Sorghum bicolor*	
93-7-15-2-3	*Sorghum bicolor*	
93-7-15-2-4	*Sorghum bicolor*	
93-7-15-2-5	*Sorghum bicolor*	
93-7-15-2-6	*Sorghum bicolor*	
93-7-15-2-7	*Sorghum bicolor*	
93-7-15-2-8	*Sorghum bicolor*	
93-7-15-2-9	*Sorghum bicolor*	
93-7-15-2-10	*Sorghum bicolor*	
93-7-15-2-11	*Sorghum bicolor*	
93-7-15-2-12	*Sorghum bicolor*	
93-7-15-2-13	*Sorghum bicolor*	
93-7-15-2-14	*Sorghum bicolor*	
93-7-15-2-15	*Sorghum bicolor*	
93-7-15-2-16	*Sorghum bicolor*	
93-7-15-2-17	*Sorghum bicolor*	
93-7-15-2-18	*Sorghum bicolor*	
93-7-15-2-19	*Sorghum bicolor*	
93-7-15-2-20	*Sorghum bicolor*	
93-7-16-1-1	*Pennisetum americanum*, K-90	Collection from Vavilov Institute, Leninglard
93-7-16-1-2	*Pennisetum americanum*, K-184	
93-7-16-1-3	*Pennisetum americanum*, K-6	
93-7-16-1-4	*Pennisetum americanum*, K-21	
93-7-16-1-5	*Pennisetum americanum*, K-32	
93-7-16-1-6	*Pennisetum americanum*, K-55	
93-7-16-1-7	*Pennisetum americanum*, K-127	
93-7-16-1-8	*Setaria italica*, K-4011	
93-7-16-1-9	*Setaria italica*, K-3913	
93-7-16-1-10	*Setaria italica*, K-3939	
93-7-16-1-11	*Setaria italica*, K-4367	
93-7-16-1-12	*Pennisetum americanum*, K-528	
93-7-16-1-13	*Setaria italica*, K-4069	
93-7-16-1-14	*Setaria italica*, K-4045	
93-7-16-1-15	*Setaria italica*, K-4028	
93-7-16-1-16	*Setaria italica*, K-4075	
93-7-16-1-17	*Pennisetum americanum*, K-10	
93-7-16-1-18	*Pennisetum americanum*, K-532	

Collection no.	Scientific name	Locality (altitude)
93-7-16-1-19	*Setaria italica*, K-251	Collection from Vavilov Institute, Leninglard
93-7-16-1-20	*Setaria italica*, K-585	
93-7-16-1-21	*Setaria italica*, K-1779	
93-7-16-1-22	*Setaria italica*, K-4070	
93-7-16-1-23	*Pennisetum americanum*, K-243	
93-7-16-1-24	*Pennisetum americanum*, K-286	
93-7-16-1-25	*Pennisetum americanum*, K-326	
93-7-16-1-26	*Pennisetum americanum*, K-343	
93-7-16-1-27	*Pennisetum americanum*, K-361	
93-7-16-1-28	*Setaria italica*, K-4388	
93-7-16-1-29	*Pennisetum americanum*, K-371	
93-7-16-1-30	*Pennisetum americanum*, K-522	
93-7-16-1-31	*Echinochloa* sp.	
93-7-16-1-32	*Pennisetum americanum*	
93-7-16-1-33	*Echinochloa* sp.	
93-7-16-1-34	*Setaria italica*	
93-7-26-1	*Panicum miliaceum*	Tashkent, Uzbekistan
93-7-27-0-1	*Zea mays*	Uzbek Institute of Plant Industry
93-7-27-0-2	*Capsicum annuum*	
93-7-27-0-3	*Capsicum annuum*	
93-7-27-0-4	*Capsicum annuum*	
93-7-27-0-5	*Capsicum annuum*	
93-7-27-0-6	*Setaria glauca*	
93-7-27-0-7	*Lolium* sp.	
93-7-29-0	*Panicum miliaceum*	Nursary school, UIPI, Uzbekistan
93-7-30-1	*Panicum* sp.	Tashkent, Uzbekistan
93-7-30-2-1	*Panicum miliaceum*	Bazaar, Tashkent, Uzbekistan
93-7-30-2-2	*Panicum miliaceum*	
93-8-1-0	*Sorghum bicolor*	Khiva, Uzbekistan
93-8-2-0	*Setaria glauca*	Khiva, Uzbekistan
93-8-2-1-1	*Panicum miliaceum*	Bazaar, Urgench, Uzbekistan
93-8-2-1-2	*Panicum miliaceum*	
93-8-2-1-3	*Sorghum bicolor*	
93-8-2-1-4	*Sorghum bicolor*	
93-8-2-1-5	*Zea mays*	
93-8-3-0	*Althaea rosea*	Urgench, Uzbekistan
93-8-5-1a-1	*Panicum miliaceum*	Bazaar, Tashkent, Uzbekistan
93-8-5-1a-2	*Panicum miliaceum*	
93-8-5-1b-1	*Panicum miliaceum*	
93-8-5-1b-2	*Sorghum bicolor*	

Collection no.	Scientific name	Locality (altitude)
93-8-7-1a-1	*Triticum aestivum;* threshed	Grand Bazaar, Tashkent, Uzbekistan
93-8-7-1a-2	*Panicum miliaceum*	
93-8-7-1a-3	*Panicum miliaceum*	
93-8-7-1a-4	*Avena sativa;* threshed	
93-8-7-1a-5	*Panicum miliaceum*	
93-8-7-1a-6	*Panicum miliaceum*	
93-8-7-1b-1	*Panicum miliaceum*	
93-8-7-1b-2	*Avena sativa;* threshed	
93-8-7-1b-3	*Triticum aestivum* with *Hordeum vulgare;* threshed	
93-8-7-1b-4	*Sorghum bicolor*	
93-8-7-1c	*Oryza sativa*	
93-8-7-1d	*Panicum miliaceum*	
93-8-9-0-1	*Echinochloa* sp.	Alma Ata, Kazakhstan
93-8-9-0-2	*Setaria glauca*	
93-8-9-0-3	Gramineae	
93-8-9-0-4	*Impatienss* sp.	
93-8-9-0-5	*Setaria viridis*	
93-8-9-0-6	*Agropyron* sp.	
93-8-9-1-1	*Panicum* sp.	Medeo, Alma Ata, Kazakhstan
93-8-9-1-2	*Panicum* sp.	
93-8-9-1-3	*Agropyron* sp.	
93-8-9-1-4	*Agropyron* sp.	
93-8-9-1-5	*Lathyrus* sp.	
93-8-9-1-6	*Capsella* sp.	
93-8-9-1-7	*Panicum* sp.	
93-8-9-1-8	*Panicum* sp.	
93-8-9-1-9	*Panicum* sp.	
93-8-9-1-10	*Epilobium angustifolium*	
93-8-9-1-11	*Agropyron* sp. (*Elymus?*)	
93-8-9-1-12	*Agropyron* sp.	
93-8-9-1-13	Gramineae	
93-8-9-1-14	*Taraxacum* sp.	
93-8-9-1-15	*Panicum* sp.	
93-8-9-1-16	*Epilobium* sp.	
93-8-10-0	*Rorippa islandica*	Bazaar, Alma Ata, Kazakhstan
93-8-10-1-1	*Taeniatherum asperum*	Issyk, Kazakhstan
93-8-10-1-2	Compositae	
93-8-10-1-3	Caryophyllaceae	
93-8-10-1-4	*Xanthium* sp.	
93-8-10-1-5	*Eupholbia* sp.	

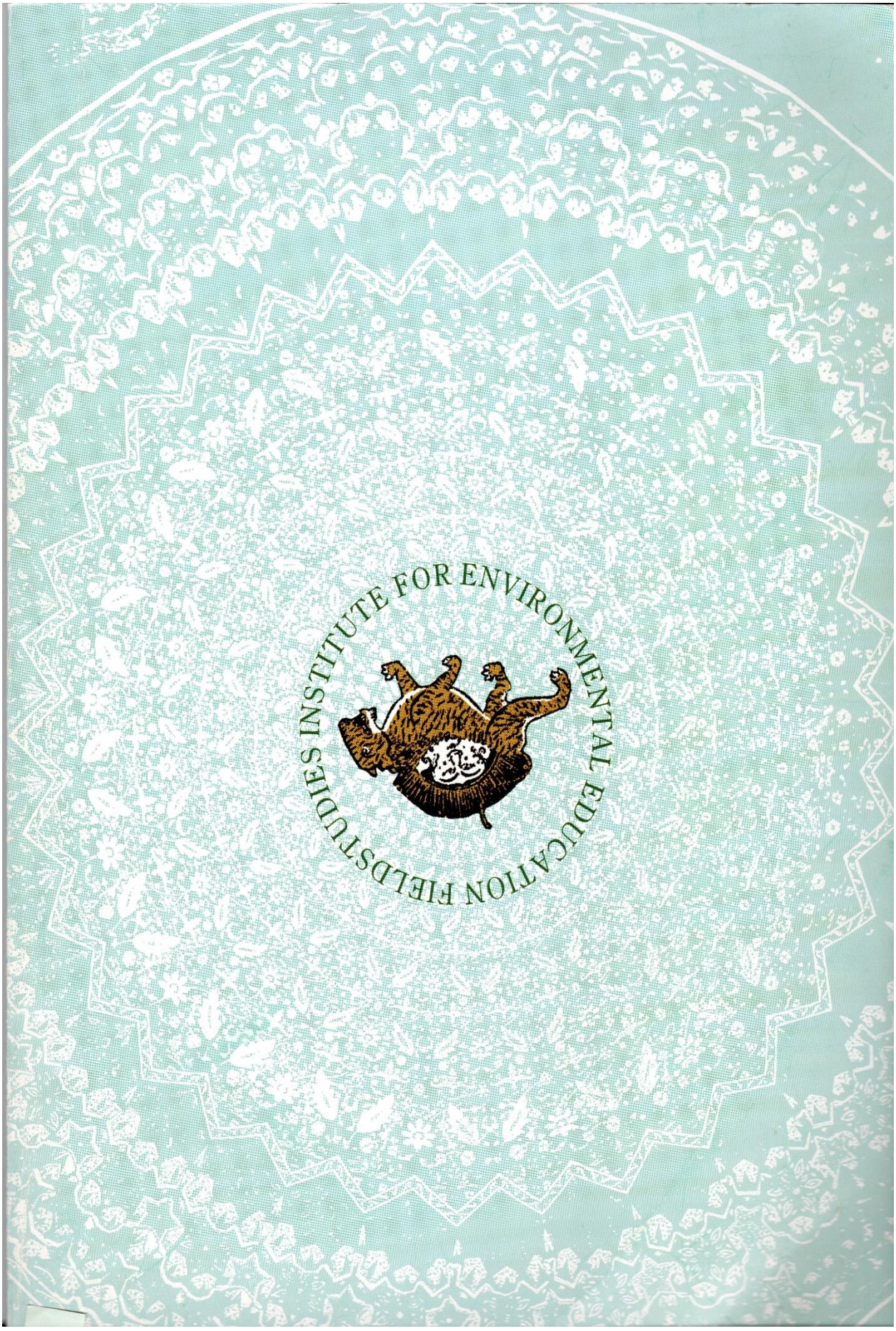
Collection no.	Scientific name	Locality (altitude)
93-8-10-1-6	*Setaria viridis*	Issyk, Kazakhstan
93-8-10-1-7	*Setaria viridis*	
93-8-10-1-8	*Setaria glauca*	
93-8-10-1-9	*Panicum* sp.	
93-8-10-1-10	Labiatae	
93-8-10-1-11	Compositae	
93-8-10-1-12	*Setaria viridis*	
93-8-10-1-13	*Hypericum* sp.	
93-8-10-1-14	*Agropyron* sp.	
93-8-10-1-15	*Althaea rosea*	
93-8-10-1-16	legume	
93-8-10-2	*Fagopyrum esculentum*	Bazaar, Issyk (751m), Kazakhstan
93-8-10-3-1	*Echinochloa* sp.	15km from Issyk to Alma Ata, Kazakhstan
93-8-10-3-2	Gramineae	
93-8-10-3-3	legume	
93-8-10-3-4	*Agropyron* sp.	
93-8-10-3-5	*Triticum aestivum*	
93-8-10-3-6	*Triticum aestivum*	
93-8-10-3-7	*Setaria viridis*	
93-8-10-3-8	*Setaria glauca*	
93-8-10-4	*Echinochloa* sp.	small bazaar near Alma Ata, Kazakhstan
93-8-10-5-1	*Fagopyrum esculentum*	near Alma Ata, Kazakhstan
93-8-10-5-2	*Setaria glauca*	
93-8-10-5-3	*Brasica* sp.	
93-8-10-5-4	*Avena* sp.	
93-8-10-5-5	*Visia* sp.	
93-8-11-0-1	*Panicum miliaceum*	Bazaar, Alma Ata, Kazakhstan
93-8-11-0-2	*Fagopyrum esculentum*	
93-8-12-0-1	*Echinochloa* sp.	
93-8-12-0-2	*Quercus* sp.	
k93-6-20-1	*Hordeum* sp.	Tashkent, Uzbekistan
k93-6-20-2	*Setaria viridis*	
k93-6-20-3	*Hordeum* sp.	
k93-6-20-4	*Avena* sp.	
k93-6-21	Compositae	Tashkent, Uzbekistan
k93-6-22-1	*Citlurus battichi*	Tashkent, Uzbekistan
k93-6-22-2	*Citlurus battichi*	
k93-6-22-3	*Cucumis melo*	
k93-6-22-4	*Cucumis melo*	
k93-6-22-5	*Cuculbita* sp.	

Collection no.	Scientific name	Locality (altitude)
k93-6-22-6	*Cucumis melo*	
k93-6-24	*Triticum aestivum*	Samarkand, Uzbekistan
k93-6-26-1	*Cirsium* sp.	Navoi, Uzbekistan
k93-6-26-3-1	Gramineae	
k93-6-26-3-2	*Pistacia vera* (wild)	
k93-6-27	*Amaranthus* sp.	Bukhara, Uzbekistan
k93-6-27-3-1	*Helianthus annuus*	
k93-6-27-3-2	legume	
k93-6-27-3-3	legume	
k93-6-27-3-4	*Sorghum bicolor*	
k93-6-28	unknown	Chardzhou, Turkmenistan
k93-7-1-2	unknown	Ashkhabad, Turkmenistan
k93-7-5-1-1	Gramineae (weed)	Chimkent, Kazakhstan
k93-7-5-1-2	Gramineae (weed)	
k93-7-5-1-3	*Hordeum* sp.	
k93-7-5-1-4	*Aegilops cylindrica* var. *typica*	
k93-7-5-1-5	*Hordeum* sp.	
k93-7-5-1-6	*Triticum aestivum*	
k93-7-5-2	*Setaria viridis*	
k93-7-5-3	Gramineae (weed)	
k93-7-6-1-1	unknown	Chimkent, Kazakhstan
k93-7-6-1-2	*Anethum graveolens*	
k93-7-6-1-3	*Piper nigrum*	
k93-7-6-1-4	*Anethum graveolens*	
k93-7-6-1-5	*Zinnia* sp.	
k93-7-6-1-6	*Allium cepa*	
k93-7-6-1-7	*Elettaria cardamomum*	
k93-7-6-1-8	*Lycopersicon esculentum*	
k93-7-6-1-9	undecided	
k93-7-6-1-10	*Brasica* sp.	
k93-7-6-1-11	*Brasica* sp.	
k93-7-6-1-12	*Lycopersicon esculentum*	
k93-7-6-1-13	*Cucumis sativus*	
k93-7-6-1-14	*Triticum aestivum*	
k93-7-6-1-15	*Cucumis sativus*	
k93-7-6-1-16	*Solanum melongena*	
k93-7-6-1-17	*Zea mays*	
k93-7-6-1-18	*Capsicum annuum*	
k93-7-6-1-19	*Eugenia aromatica*	
k93-7-6-1-20	*Cucullbita* sp.	

Collection no.	Scientific name	Locality (altitude)
k93-7-6-1-21	*Brasica* sp.	Chimkent, Kazakhstan
k93-7-6-1-22	*Citlurus battichi*	
k93-7-6-1-23	*Daucus carota*	
k93-7-6-1-24	*Brasica* sp.	
k93-7-6-1-25	*Panicum miliaceum*	
k93-7-6-1-26	unknown	
k93-7-7-1-1	Gramineae (weed)	Dzhambul, Kazakhstan
k93-7-7-1-2	*Triticum aestivum*	
k93-7-7-1-3	*Hordeum spontaneum*	
k93-7-7-1-4	*Triticum aestivum*	
k93-7-7-1-5	*Hordeum vulgare* (six-rowed)	
k93-7-8	*Setaria viridis*	
k93-7-9-1-1	*Aegilops cylindrica* var. *typica*, var. *pauciaristata* mixed	Bishkek, Kirghistan
k93-7-9-1-2	Gramineae (weed)	
k93-7-9-1-3	*Triticum aestivum*	
k93-7-9-1-4	*Secale cereale*	
k93-7-9-1-5	*Aegilops cylindrica* var. *typica*; natural hybrid of *Triticum aestivum* x *Aegilops*	
k93-7-10-0	Gramineae	
k93-7-10-1	*Triticum aestivum*	
k93-7-11-1-1	*Hordeum vulgare* (two-rowed)	Alma Ata, Kazakhstan
k93-7-11-1-2	*Aegilops cylindrica* var. *typica*	
k93-7-11-1-3	*Triticum aestivum*	
k93-7-11-1-4	*Carthamus tinctorius*	
k93-7-11-1-5	*Hordeum vulgare* (two-rowed)	
k93-7-11-1-6	*Triticum aestivum*	
k93-7-12-1	*Capsela* sp. (weed)	
k93-7-12-4	*Pennisetum americanum*	
k93-7-13-1-1	*Brasica* sp.	
k93-7-13-1-2	legume	
k93-7-13-1-3	*Cucumis sativus*	
k93-7-13-1-4	spice, Umbelliferae	
k93-7-13-1-5	legume	
k93-7-13-1-6	Compositae	
k93-7-13-1-7	legume	
k93-7-13-1-8	legume	
k93-7-13-1-9	*Cucumis sativus*	
k93-7-13-1-10	*Allium cepa*	
k93-7-13-1-11	unknown	
k93-7-13-1-12	*Piper nigrum*	

Collection no.	Scientific name	Locality (altitude)
k93-7-13-1-13	legume	
k93-7-13-1-14	*Allium* sp.	
k93-7-13-1-15	spice, Umbelliferae	
k93-7-13-1-16	legume	
k93-7-13-1-17	undecided	
k93-7-13-1-18	*Capsicum annuum*	
k93-7-13-1-19	*Eugenia aromatica*	
k93-7-13-1-20	undecided	
k93-7-13-1-21	*Hypericum* sp.	
k93-7-13-1-22	*Anethum graveolens*	
k93-7-13-1-23	*Carthamus tinctorius*	
k93-7-13-1-24	*Brasica* sp.	
k93-7-13-1-25	legume	
k93-7-13-1-26	*Piper nigrum*	
k93-7-13-1-27	spice, Umbelliferae	
k93-7-13-1-28	legume	
k93-7-13-1-29	spice, Umbelliferae	
k93-7-13-1-30	legume	
k93-7-13-1-31	spice, Umbelliferae	
k93-7-13-1-32	*Daucus carota*	
k93-7-13-1-33	legume	
k93-7-16	*Triticum aestivum*	Tashkent, Uzbekistan
k93-7-17-1	Gramineae (weed)	
k93-7-17-2	Triticeae	
k93-7-17-3	Triticeae	
k93-7-17-4	*Gossypium hirsutum*	
k93-7-17-5	*Gossypium hirsutum*	
k93-7-17-6	*Gossypium hirsutum*	
n93-7-26-1-1	*Panicum miliaceum*	Samarkand, Uzbekistan
n93-7-26-1-2	*Zea mays*	
n93-7-26-1-3	spice, Umbelliferae	
n93-7-26-1-4	*Medicago sativa*	
n93-7-26-1-5	*Medicago sativa*	
n93-7-26-1-6	*Medicago sativa*	
n93-7-26-2-1	*Hordeum* sp.	
n93-7-26-2-2	*Triticum aestivum*	
n93-7-26-2-3	*Sorghum bicolor*	
n93-7-27-1-1	*Panicum miliaceum*	Bazaar, Samarkand, Uzbekistan
n93-7-27-1-2	*Triticum aestivum*; threshed	
n93-7-27-1-3	legume	

Collection no.	Scientific name	Locality (altitude)
n93-7-27-1-4	legume	Bazaar, Samarkand, Uzbekistan
n93-7-27-1-5	*Cicer arietinum*	
n93-7-27-1-6	*Cicer arietinum*	
n93-7-27-1-7	*Panicum miliaceum*	
n93-7-27-1-8	*Hordeum vulgare*	
n93-7-27-1-9	*Cicer arietinum*	
n93-7-27-1-10	*Cicer arietinum*	
n93-7-28-1-1	*Zea mays*	Bazaar, Shakhrysyabz, Uzbekistan
n93-7-28-1-2	*Triticum aestivum;* threshed	
n93-7-28-2-1	*Oryza sativa*	Bazaar, Shakhrysyabz, Uzbekistan
n93-7-28-2-2	*Oryza sativa*	
n93-7-28-2-3	*Oryza sativa*	
n93-7-28-2-4	*Echinochloa* sp.	
n93-7-28-2-5	*Echinochloa* sp.	
n93-7-28-2-6	*Setaria glauca*	
n93-7-28-2-7	*Oryza sativa*	
n93-7-28-2-8	*Oryza sativa*	
n93-7-28-3	*Setaria glauca*	Bazaar, Shakhrysyabz, Uzbekistan
n93-7-29-1-1	*Triticum aestivum*	between Tashkent and Samarkand
n93-7-29-1-2	*Hordeum vulgare* (four-rowed)	
n93-8-5-2-1	*Panicum miliaceum*	Bazaar, Bukhara, Uzbekistan
n93-8-5-2-2	*Panicum miliaceum*	
n93-8-5-2-3	*Zea mays*	
n93-8-5-2-4	*Sorghum bicolor*	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