PLANT GERMPLASM COLLECTION REPORT

USDA-ARS
FORAGE AND RANGE RESEARCH LABORATORY
LOGAN, UTAH

Foreign Travel to:
China
July 25 - August 25, 1988

TITLE: A Report of Collecting Expedition to Northeast China for Triticeae Genetic Resources in 1988

U.S. Participants

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GERMPLASM ACCESSIONS

One month expedition on germplasm resources of Triticeae was carried out in both Jilin and Heilongjiang Province Northeast China, from July 25 to Aug 25, 1988. The trip covered Changbai Mt., Songnen Plain and Lesser Xing'an Mt. and traveled over 4000 kilometers. 97 seed samples and 104 herbaria were collected, which belong to 18 species and varieties of 7 genera respectively. All of then are perennials grown in natural population only one sample of rye is an annual mixture in spring wheat field. The collected materials kept in ICGR, CAAS.

We have planned to go to Great Xing'an Mt. this year. But for encountered floods there then, we went to the Lesser Xing'an Mt. instead.

Participants:

Chinese specialists:

Ms. Dong Yushen Team leader, Prof. ICGR, CAAS
Ms. Zhou Ronghua Ass. Prof. ICGR, CAAS
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Itinerary:

July 25 The expedition members arrived in Beijing

26 Beijing-Changchun by air

27-28 Changchun-Zuojia in Jiutai County-Jilin City-Huadian-both Great and Lesser Sand River in Antu County-Songjiang-Baihe Town by bus.

29-30 Collecting in Changbai Mt. region

31-Aug 1 Changbai Mt.- Changchun by bus, Collecting along roadside

2-8 Changchun-Baicheng, some by jeep, some by train, expedition in Baicheng City and its surrounding counties viz Changling County, Tongyu County, Taonan County, Da'an County and Zhenlai County etc.

9 Baicheng-Qiqihare City, some by train some by jeep.

10-13 Collecting in Qiqihare City and Fuyu County.

14-16 Collecting in Hehe County.

17-21 Collecting in Nanjiang County, on the Lesser Xing'an Mt. mainly

22 Nenjiang-Harbin by train

23 Visit the work on wide crosses of wheat at Heilongjiang Academy of Agricultural Sciences

24-25 Harbin-Beijing by air

Distribution of Triticeae and Ecotope of Expedition area

Northeast region of China, including Heilongjiang Province, Jilin Province and Liaoning Province, is located on east edge of Eurasia continent, 39-53.5 N. latitude and 115-135 E. longitude, with total area 1,236,000 square km. Its terrain slopes quite gently. The highest Mt., namely the major peak of Changbai Mt., is 2690 m above sea, and located in east part of the area. To the west is the Great Xing'an Mt. Its north part is the Lesser Xing'an Mt. about 600-1000 m above sea. Center and south parts are Northeast Plain where is a place concentrated cropland at elevation of nearly 200 m. The west part is Songnen Plain which is well-known for its grassland. The climate, in winter, is controlled by high pressure which comes from Mongolia Plateau from the west and it is dry and very cold. In summer, it is influenced by eastern marine air-mass, so it is blazing and rains a lot.

1. Changbai Mt. and east Jilin

From Changchun eastward, through Jilin City to Huadian about 200 km, the hills slope gently, undulating between 300 and 400 m above sea level. Most of the land spread along the road is cultivated. We often find Roegner komoji, R. ciliaris and Elymus cylindricus on roadsides and field borders. The companion plants are Artemisia silversiana, Polygonum orientale, Kummerowia stipulacea, Chenopodium album and Artemisia scoparia ete. Moving to east from Huadian, elevation rising, through Jiapigou and Songjiang to Baihe Town at the foot of main peak of Changbai Mt., hills rise and down between 600 and 700 m above sea level. Soil becomes black gradually. Roegneria turczaninovii, R. ciliaris, Elymus excelsus and E. sibiricus etc. appeared on roadsides and field borders.

Changbai Mt. is highest in northeast region. Its vegetation vertically dispersed clearly, for example, Broad-leaf forest belt is between elevation of 500 and 740 m, coniferous forest belt 1100-1800 m, Betula ermanii forest belt 1800-2100 m, Tundra belt 2100-2691 m. At top, annual average temperature is -7.4C only, that of Jan -23.8C and that of July 8.5C. Clouds and fogs curl up day and night. Annual precipitation is about 1000 mm. Individual Elymus sibiricus plants appear above elevation of 1200 m occasionally. Forest on Changbai MT. Was destroyed seriously. Triticeae plants are distributed on the roadsides and lawn of coniferous and broad-leaf mixed forest belt located below elevation of 1100 m.

The commonest species of Triticeae is Elymus sibiricus (Fig.1) which disperses widely, but below elevation of 1000 m. We observed the plant everywhere in Baihe Town, with elevation of 740 m at the foot of Changbai Mt. E. sibiricus grow luxuriantly and mature at late July to early Aug. Other common species, such as Roegneria nakii, R. ciliaris and R. turczaninovii, grow on roadsides and under small shrubs at elevations of less than 840 m, and probably maturing in late July. There also are Elymus excelsus and E. dahuricus var. violeus dispersing sparsely. We estimate both should mature in the middle Aug., so we have not collected any seed.

2. South part of Songnen Plain

This area is in then middle part of the Northeast Plain. From Changchun through Changling County to Baicheng. Its topography slopes gently, mostly elevating about 200-300 m, few hills up to 600 m. Grassland distributes widely in the region. However, there are also some marshland and alkaline meadows. We failed to investigate marshland area for too much rain there. Its

annual average temperature is 4-5C, but varies yearly and daily. The average lowest temperature ranges from -34 to -35C, and the average highest 36-37C. Annual precipitation in 400-510 mm, and 77% of it raining between June and Aug. All kinds of soils, such as grassy marsh soil, saline-alkalic soil, black calcium soil, maroon-black calcium soil and sand soil etc. are alkaline, and content little organic matters.

Moving to west from Changchun, we find Leymus chinensis, Elymus cylindricus and E. dahuricus appeared all the way. We collected a sample of Roegneria pendulina at Wudatun Village, Taipingshan Town, Changling County. Roegneria genera distributes widely from Changchun eastward, and is not seen from Changling westward. The companion plants here are Steromorea integrifolia, Thalictrum simplex, Potentilla chinensis, Melilotus suaveolens and Artemisia annua etc.

More than 78% grassland is meadow steppe. Leymus chinensis is one of the found species which has wide distribution. In south outskirts of Baicheng, there are about 700 hectare meadow steppe of L. chinensis belongs to Baicheng Station. Southward, on meadow steppe in the south part of Taonan County, L. chinensis is very popular species here. But towards north, it is a companion plant growing on Stipa steppe at Dagang of Ping'an Town. Moving east, from Baicheng to Da'an County, this species appeared oddly. It is often seen along the road from Baicheng to Wulanhote of Inner Mongolia. This species in this area distributes at elevation of 240-360 m.

In addition, Elymus cylindricus, E. dahuricus and L. sibiricus also distribute widely in this region. Beside roads and disused cannel at Dagang in the north of Baicheng L. chinensis, E. sibiricus and E. cylindricus have collected. Going west along the road from Baicheng to Wulanhot of Inner Mongolia under trees and in lawn the L. chinensis, E. cylindricus and a few E. sibiricus have been obtained. Major companion plants for above mentioned species are populations of Artemisia frigida, Ar. mongolica, Lespedeja biocoilor and Linum stelleroides etc. This area is at elevation of 425-450 m.

From Baicheng eastward along Baicheng Da'an road, we found great pieces of reedy marsh. On the edge and slope of the road, we found abundant Phragmitis communis, Deyeuxia anguitifolia, Artemisia mongolia, Vivia amurensis and Sanguisorba offficinalis etc. weeds and Salix sp., Papulus simonii etc. trees. E. dahuricus was presenting everywhere in thick grass and under trees along the roadsides, seldom did L. chinensis. Passing Tao River, the sandiness of the soil became clearer. In Sheli District of Zhenlai County, a dune appeared. Its gentle slope has become cropland by reclaiming. Small trees of Populus grow up by roadsides. We found Agropyron cristatum (Fig.1) under trees and on a sand heap beside cropfield. It is clear that A. cristatum has been destroyed by man and animal, but still survive on sandland about 30 kilometers along the road. The chief companion plants are Lespedeza bicolor, Salsola collina, Setaria viridis and Xanthium strumarium etc.

From Baicheng northward, at the south part of Youfan Village in Momoge District Zhenlai county, there is a piece of salinized damp lowerland where is a meadow steppe covering by Hordeum brevisubulatum. This is a dominant species is flourishing, and maturing i0n early August. The main companion plants are Phragmitis communis and Calamogrostis epigios. Along Baicheng-Qiqihare line further northward, we often saw Agropyron cristatum and L. chinensis

on grassland by roadsides or under sparse and small forests in Wukeshu community, Zhenlai County. The soil is fine sandy, companion plants are Lespedeza bicolor, Salsola collina, Setaria viridis and Xanthium strumarium etc.

From Baicheng northward, at the south of Youfang Village in Zhenlai County, there is a salinized damp lower land covered by Hordeum brevisubulatum. It is a dominant species that is flourishing and being mature in early August. The companion plants are Phragmitis communis and Calamogrostis epigios mainly. Along Baicheng-Qiqihare highway in territory of Zhenlai County in the lawns and under trees, A. cristatum and L. chinensis are often seen. The soil of these places is sandy.

3. The middle and north parts of Songnen Plain

We investigated Qiqihar City, Fuyu County and Nehe county. The topography of this area mostly is plain and gentle hill slopes. Generally speaking, its elevation is from 120 to 300 m. Most of this area is Songnen meadow. Its annual average temperature is 0.7-4.2C. Temperature of January ranges from -18 to -21.3C. Critical temperature is between -35 and -42.2C. Non frost season lasts about 110 to 145 days. Annual precipitation is 368 to 500 mm. 65%-70% of it falls between June and August. The soils are mainly black calcium and grassy marsh, a little portion is saline, sand soil, marsh soil and black soil.

From Qiqihar City southeastward to Shuishi District, there are about 330 ha. L. chinensis meadow steppe. We found many alkaline spots on the meadow steppe, and no grass growing in each spot, but Hordeum brevisubulatum growing surround each of them. Most of H. brevisubulatum (Fig.3) had matured earlier and ears had dropped. On the way to Shuishi District we saw H. brevisubulatum also distributed on salinized fine sand land, Agropyron cristatum was often seen there too. Leymus chinensis, Calamogrostis epigios and Phragmitis communis are companion plants here. 20 km away from Qiqihar City, there is a piece of where dry reed marshland were growing a lot L. chinensis and H. brevisubulatum. Along the road, Elymus dahuricus and E. cylindricus were distributed on the slope and under small trees of Populus sp. The companion plant are chiefly Artemisia scoparia, Ar. japonica, Allium odorum and Calamogrostis eqigios etc. From Qiqihar City moving southeast, took 26 km to Zhalong Crane Natural Protected Area, we found L. chinensis, A. cristatum, E. dahuricum, and E. cylindricus all the way.

Animal husbandry is very important in Fuyu County. There are more that 130,000 ha. steppes, the meadow steppe is dominant, marsh prairie the second. From Qiqihare City to Fuyu County even Nehe County, most of land is meadow steppe. Some of them submerged. We often along roadsides found H. brevisubulatum, E. cylindricus and E. dahuricus, but seldom saw L. chinensis. In Friendship District, 50 km to southwest of Fuyu County Town, there is a L. chinensis meadow steppe. Some of them did not ear for growing over exuberantly. However, H. brevisubulatum had matured early and become the second dominant species next to L. chinensis. The soil here is black. Other major plants are Medicago sativa, Artemisia scoparia, Echinochloa crusgalli, Calamagrostis eqigios and Sanguisorba lenuifolia etc. At the south part of this meadow steppe, there is a small artificial grassland where E. sibiricus was dominant and grew very well. Other plants, such as E. cylindricus, E. dahuricus and L. chinensis, grew well too. To the south

Fulin Village in Friendship District, there is a sand hill on which A. cristatum distributed sparsely. The companion plants are Stipa baicalensis, Artemisia scoparia, Setaria viridis and Arundinella hirta etc. According to investigation of local people, there still were Elymus excelsus, Leymus secalinus, Elytrigia repens and Roegneria turczaninovii etc. on grasslands in Fuyu County. But we failed to collect them for the lower damp places submerged.

Nehe County, locating on the boundary area between Songnen Plain and the Lesser Xing'an Mt., is a semi-agriculture and semi-animal husbandry county. The area of grassland covers more than 90,000 ha. The soil is fertile, and wheat, soybean, and potato are major crops there. Corn grew well too. The lower region in west part of the county was submerged by Nenjiang River's flood. The east part is higher. Nehe County town is at elevation of 240 m above sea. From the county the town went east, we found E. dahuricua and E. cylindricus first, E. sibiricus and R. turczaninovii var. macrathera later. When elevation raised higher than 300 m, these four species became more. While arriving at platform grassland of Green Grassland Animal Farm (elevation 420 m), we saw both R. turczaninovii var. macrathera (Fig.4) and E. sibiricus (Fig.5) matured everywhere. It is really a delightful scenery. There are few plants of E. cylindricus and E. dahuricus might mature on late August. The soil of this region is black soil. Other plants grow are Sanguisorba offisinalis, Adenophora tetraphylla, Calamogrostis epigios, Geum aleppicum and Clematis manshuria etc. Moving east 15 km further, we arrived Maoshan Forest Farm where is 90 km far away from Nehe County Town. The soil is very fertile and we found many of the 4 species of Triticeae mentioned above and several E. excelsus among the population of grass too. The plant is higher than 1.6m, even up to 2 m. The major companion plants are Artimisia mongolica, Agrimonia pilosa, Sanguisorba officinalis and Lespedeza bicolilor etc. In the northern roadside, grows Quercus forest, the south is grassland where grow Corylus heterophylla shrub as well. Triticeae plants are seen along roadsides only, viz not seen in deep forest or on grassland. At roadside of this place, we found some plants with half-droop ears and no seed. Morphologically they look like natural hybrids of E. sibiricus and E. dahuricus. Near Nehe County Town there is H. brevisubulatum on lower wet field edge or under small trees (at elevation of 240 m). There is more plants of this species on the lower-wet lands of west and southern parts of the Nehe County.

4. The Lesser Xing'an Mt. Region

Nenjing County is at the west foot of the Lesser Xing'an Mt., with north high south lower and east high west lower topography. The County Town is at elevation about 320 m. Form here toward north appear low hillocks with gentle slopes ranging from elevation 300 m to 400 m. From Woduhe northward, terrain is a little higher and some undulating mostly at elevation of 400-600 m, and being covered densely by forest. Nenjiang County is north-south oriented narrow corridor. "4 F 2 G 1 W 3 C" means 40 percent of the area is covered by forest, 20% grass, 10% water and 30% crops. Its winter last long and summer short. Annual average temperature ranges between -2C and 1C, that of January is -26.1C, that of July 21.7C. The lowest is -48C, the highest is 37C. Non frost period last 71 to 137 days, 111 days in average. Annual precipitation ranges from 338 to 708 mm, 438 mm in average, 65% of it rains between June and August. The soil is mainly fertile black soil. In the Lesser Xing'an Mt. region, dim-brown soil is the major one, there are some other kinds of soil, such as grassy marsh soil and overflow soil etc. The "4 general species of Triticeae", viz. E. sibiricus, E. cylindricus, E. dahuricus and R. turcaninovii

var. macrathera distributes in the area widely. Although it is difficult to find them in forest and meadow (mostly in marsh land) but quite easy to find each of them on nearby forest edge, roadside lawn and under sparse shrubs over whole province (elevation range 320-770 m). E. sibiricus is the most common and most flourishing species. At places, it is about 120 cm high, with ears more that 10 cm long. Crowd ears fluttered in the breeze, very luring. The R. turczaninovii var. macrathera is the second most common species. Both species have same distribution, and often grow together.

From Nenjiang County Town toward north, along Neijian-Mohe highway, we saw "4 general species" mentioned previously. By 225 km from Nenjiang, the highest point appeared, at elevation of 700 m, named Gungtuling. Coniferous and broad-leaf mixed forest is major vegetation in the area. Major trees are Betula plalyphylla, B. davurica, Populus davidiana and pine trees. Here, "4 general species" grew very well, and plants similar to hybrids of E. sibiricus and E. dahuricus (Fig.6) were also found. From Gungtuling northward more than 20 km enter cold temperate zone. Near Forest Farm of Centre Station, 50 45' north latitude at elevation of 560 m, vegetation is the same as Gungtuling, "4 general species" still grow very well. In the zone, major companion weeds are Deyeuxia angustifolia, Aster tataricus, Sanguisorba rectispica, Vicia cracca, Artemisia sylvatica, Vicia unijuga, Hicracium umbelatum and Pteridium aquilinum etc.

In Nenbei Farm, 62 km from Nenjiang, there are more that 7 ha. marsh meadow where Elytrigia repens (Fig.7,8) was absolutely dominant, 150 cm high and grew strongly, probably was sown by people. Here the terrain is lower at elevation of 380 m. The lower places were in water. Few other plants such as Artemisia mongolica, Cirsium segelun, Eloholtzia patrini and Sonckus brachyotus etc. appeared.

From Nenjiang County Town moving 30 km to northeast along Nenjiang-Mohe highway, we entered the forest area of the Lesser Xing'an Mt. It is a coniferous and broad-lead mixed forest consists of Betula and pine tree mainly, with some Quercus mongoilca. Along the road, there are still some shrub and meadow. After moving more that 70 km, we saw Triticeae grass become more and more. E. sibiricus and R. turczaninovii var. macrathera are most in number, E. cylindricus and E. dahuricus the second, still, a few E. excelsus growing on fertile lawn along the roadsides. At 116 km along the highway, named Daling at elevation of 770 m, it is the boundary of the Lesser Xing'an Mt. There is a way within the forest, where "4 general species" and the plants similar to the hybrids of E. sibiricus and E. dahuricus were seen. There are few L. chinensis grew along the road.

In the lawn within forest of Daling, there are 2 kinds of plants morphologically like Elytrigia repens. Both have root stock. One of them, with long cylinder shaped ear, sparsely arranged spikelets and awnless. Another one is with two sides flatted ear, quite densely arranged spikelets and short awn of 6-7 mm. Two kinds of plants grow mixed and mature in middle August. In addition to "4 general species", other companion plants Artemisia mongolica, Vicia cracca, Impatiens nolitangere, Deyeuxia anguitifolia and Urtica angastifolia etc.

The characteristics of Triticeae in the Northeast China

1. General Elymus Linn

There are 12 species in China, 5 of them in Northeast area, viz. E. sibiricus, E. cylindricus, E. dahricus, E. excelsus and E. nutans. 4 of them have collected except E. nutans which distributes in north part of the Great Xing'an Mt. In addition, we found several E. dahuricus var. violeus plants at roadsides (elevation of 820 m) of western part of Baihe Town, but have not collected any seeds for it begin grouting then.

The distribution of E. sibiricus is widest, east form Changbai Mt., west to the edge of Inter Mongolia Plateau, south from Baichen, north to cold temperate zone more than 50 north latitude. But it is mostly in both Changbai and the Lesser Xing'an Mt. This species is suited to grow in mountainous region under cold-cool climate. It is quite gathered between elevation of 700 to 1000 m in Changbai Mt. and distributes at elevation of more than 400 m in the Lesser Xing'an Mt. It was not seen among natural vegetation at elevation of less than 300 m on plain. Its suitable soil are mountainous brown and black soil.

E. cylindricus and E. dahuricus distribute widely too. But they are not found in Changbai Mt. E. cylindricus is common on plain of center Jilin Province. In north part of Songnen Plain and the Lesser Xing'an Mt., these two species are common between elevation of 190 and 770 m. They are suitable to grow in more kinds of soil, not only in mountainous brown soil, black soil and black calcium soil, but also in grassy marsh land and saline-alkaline soil. They usually grow on roadsides, field borders, lawn in forest and under small trees, and likely become companion plant on meadow steppe.

E. excelsus distributes sparsely on fertile black soil on forest edge and roadsides Changbai Mt. (at elevation of 710-805 m) and the Lesser Xing'an Mt. (at elevation of 380-550 m).

The plants morphologically like hybrid between E. sibiricus and E. dahuricus were often found on forest edge and lawn, where the two species distributing together at more than 400 m above sea level in the Lesser Xing'an Mt. They grow flourishing but are sterile. It enlightens us to pay more attention to interspecies crosses within Elymus genera.

2. Genera Roegneria C. Koch

It is reported that there are more than 10 species in the Northeast, 8 of them were collected. R. turczaninovii var. macrathera is most important in the genera. It is a dominant species at the Lesser Xing'an Mt. and very common from northeast part of Nehe to north part of Nenjian County about 300 m above sea level. It is abound on road-sides, forest edge and lawn by shrub accompanying E. sibiricus and E. dahuricus etc., and growing very well. Other species such as R. kamoji, R. ciliaris and R. japonensis var. hackeliana grow on plain of middle Jilin Province. From Changling westward on Songnen Plain, not found any Roegneria Plant.

3. Genera Leymus Hochst

There are two species in Northeast, we collected L. chinensis, but have not collected L. secalinus for we failed to reach the lower wet area. L. chinensis is one of the found species on meadow steppe on Songnen Plain, and is a companion species while other species are found on meadow steppe and meadow. It is an important forage in Baicheng area. Its vertical distribution ranges form 190 to 360 m above sea level. However, we occasionally saw it at elevation of 300-770 m. It has no strict need for soil, grows in marshland and black calcium soil mostly. It can grow in black soil, black calcium soil and saline-alkaline soil, even sand soil.

4. Genera Hordeum Linn

It is reported that there are 4 species viz. H. brevisubulatum, H. brevisubulatum var. hirtelleum, H. sibiricum and H. jubatum. We collected first one only. H. sibiricum distributes in north part of the Great Xing'an Mt. H. brevisubulatum is one of the found species which contributes to meadow. On salinized lower wet land in west part of Jilin Province, although H. brovisubulatum meadow is not very large in this area, it has good effects on improving and utilizing lower wet and saline-alkalic grassland. Therefore, the people there in all ways are collecting and spreading better H. brevisubulatum varieties. It is also a companion plant of Puccinellia hauptiana on marshland. It distributes sparsely on lower wet meadow, roadsides, and under trees at elevation of below 300 m. It grows in black-alkaline soil and salinized fine sand soil.

5. Genera Agropyron Gaertn

It is reported that there are 3 species viz. A. cristatum, A. mongolicum and A. Arenarium in Northeast. We collected first one only. It distributes on sandy heaps and sand field in Songnen Plain. Because vegetation in places near towns was destroyed seriously, very few plants of A. cristatum only become remnants left on field border and sand hillocks, or in lawns under trees or shrubs along roadsides. Its distribution elevation ranges from 200 to 280 m.

6. Genera Elytrigia Desv.

There is only one species, El. repens, grown in this area. We found it with two types of ear in lawn within the forest of the Lesser Xing'an Mt., at elevation of 770 m. This species is also found in marsh meadow of Nenbai Farm in the north of Nenjiang County. It probably sowed by people here. It is clear that this species is introduced, because of its narrow distribution.

Table 2. The Collections of the Triticeae from Northeast China in 1988

Number	Species	Locality	Elevation (m)	Coll. date
88-1	Elymus Sibiricu Linn	Jilin, Antu, Yongqing-Songjiang, roadsides	610	28/7
88-2	Roegneria ciliaris Nevski	Jilin, Antu, Yongqing-Songjiang,	610	28/7

		roadsides		
88-3	Elymus sibiricus Linn	Jilin, Changbai Mt., roadsides	1700	29/7
88-4	Roegneria nakaii Kitag	Jilin, Antu, Erdao Forestry Farm, along the road, lawn	720	30/7
88-5	Elymus sibiricus Linn	Jilin, Antu, Erdao Forestry Farm, along the road, lawn	720	30/7
88-6	E. excelsus Turcz.	Jilin, Antu, Erdao Forestry Farm, along the road, lawn	710	30/7
88-7	E. excelsus Turcz.	Jilin, Antu, Baihe Town, in the garden of Ecostation of Changbai Mt.	805	30/7
88-8	Roegneria ciliaris Nevski	Jilin, Antu, Baihe Town, in the garden of Ecostation of Changbai Mt.	805	30/7
88-9	Roegneria ciliaris Nevski	Jilin, Antu, Baihe Town, in the garden of Ecostation of Changbai Mt.	805	30/7
88-10	Elymus dahuricus var. violeus Wang et Yang	Jilin, Antu, Baihe Town, road-side slope	805	30/7
88-11	Roegneria turczaninovii Nevski	Jilin, Antu, Baihe Town, road-side slope	820	30/7
88-12	R. Ciliaris Nevski	Jilin, Antu, Baihe Town, road-side slope	840	30/7
88-13	Secale cereale Linn.	Jilin, Antu, Xiaoshahe District, wheat field	840	30/7
88-14	Elymus excelsus Turcz	Jilin, Antu, Xiaoshahe District, wheat field	730	31/7
88-15	Roegneria turczaninovii Nevski	Jilin, Antu, Xiaoshahe District, wheat field	730	31/7
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-16	R. kamoji Ohwi	Jilin, along the road from Jilin to Changchun, beside corn field	310	1/8
88-17	R. ciliaris Nevski	Jilin, along the road from Jilin to Changchun, beside corn field	310	1/8
88-18	Elymus cylindricus (Franch.) Honda	Jilin, along the road from Jilin to Changchun, beside corn field	310	1/8
88-19	Elymus cylindricus (Franch.) Honda	Jilin, Changling, Tai-pingchaun Town, roadsides	350	2/8
88-20	Leymus chinensis (Trin.) Tzvel.	Jilin, Changling, Tai-pingchaun Town, roadsides	350	2/8
88-21	Roegneria japonensis var. hackeliana	Jilin, Changling, Tai-pingchaun Town, roadsides	350	2/8

88-22	Leymus chinensis (Trin.) Tzvel.	Jilin, Changling, Tai-pingchaun Town, roadsides	350	3/8
88-23	Elymus cylindricus (Franch.) Honda	Jilin, Changling, Tai-pingchaun Town, roadsides	350	3/8
88-24	Leymus chinensis (Trin.) Tzvel.	Jilin, south suburbs of Baicheng, meadow-steppe	280	4/8
88-25	Elymus cylindricus (Franch.) Honda	Jilin, south suburbs of Baicheng, meadow-steppe	280	4/8
88-26	Leymus chinensis (Trin.) Tzvel.	Jilin, south suburbs of Baicheng, meadow-steppe	280	4/8
88-27	Elymus dahuricus Turcz.	Jilin, Baicheng, in the garden of Baicheng Grass-land station	280	4/8
88-28	Leymus chinensis (Trin.) Tzvel.	Jilin, Baicheng, Dagang, stipa grassland	360	4/8
88-29	Leymus chinensis (Trin.) Tzvel.	Jilin, Baicheng, Dagang, stipa grassland	350	4/8
88-30	Leymus sibiricus Linn.	Jilin, Baicheng, Dagang, along an abandoned ditch	350	4/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-31	E. cylindricus (Franch.) Honda	Jilin, Baicheng, Dagang, along a disused canal	350	4/8
88-32	Leymus chinensis (Trin.) Tzvel.	Jilin, Taonan, Meadow-steppe	260	5/8
88-33	Elymus cylindricus (Franch.) Honda	Jilin, Taonan, along the road	250	5/8
88-34	E. dahuricus Turcz.	Jilin, south 15 km from Baicheng, along the road, beside a reedy meadow	240	5/8
88-35	Leymus chinensis (Trin.) Tzvel.	Jilin, south 15 km from Baicheng, along the road, beside a reedy meadow	240	5/8
88-36	Agropyron cristatm (Linn.) Gaertn.	Jilin, by 869 km of the highway of Changchun-Baicheng, on a sandhill	230	6/8
88-37	Agropyron cristatm (Linn.) Gaertn.	Jilin, by 837 km of the highway of Changchun-Baicheng, on a sandhill	240	6/8
88-38	Leymus chinensis (Trin.) Tzvel.	Jilin, by 846 km of highway of Changchun-Baicheng, in a meadow	235	6/8
88-39	Leymus chinensis (Trin.) Tzvel.	Jilin, by 948 km of highway of Baicheng-Wulanhot, under trees	360	7/8
88-40	Elymus cylindricus (Franch.) Honda	Jilin, by 960 km of highway of Baicheng-Wulanhot, in the lawn	425	7/8
88-41	E. sibiricus Linn.	Jilin, by 961 km of highway of	450	7/8

		Baicheng-Wulanhot, under trees		
88-42	E. sibiricus Linn.	Jilin, Baicheng, beside the experiment field, in the lawn	260	8/8
88-43	Hodeum brevisbulatum (Trin.)Link	Jilin, Baicheng, beside the experiment field, in the lawn	260	8/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-44	Elymus cylindricus (Franch.) Honda	Heilongjiang, north 35 km from Qiqihar, beside a meadow-steppe	230	10/8
88-45	Hodeum brevisubulatum (Trin.) Link	Heilongjiang, north 35 km from Qiqihar, beside a meadow-steppe	230	10/8
88-46	Leymus chinensis (Trin.) Tzvel.	Heilongjiang, north 35 km from Qiqihar, beside a meadow-steppe	230	10/8
88-47	Elymus dahuricus Trucz.	Heilongjiang, north 50 km from Qiqihar	230	10/8
88-48	Agropyron cristatum (Linn.) Gaertn	Heilongjiang, Friendship District, in the lawn on a sandhill	265	11/8
88-49	Leymus chinensis (Trin.) Tzvel	Heilongjiang, Friendship District, in the lawn on a sandhill	265	11/8
88-50	Elymus sibiricus Linn.	Heilongjiang, Fuyu, west of Fulu Town, artificial grassland	300	11/8
88-51	E. cylindricus (Franch.) Honda	Heilongjiang, Fuyu, west of Fulu Town, artificial grassland	300	11/8
88-52	Leymus chinensis (Trin.) Tzvel.	Heilongjiang, Fuyu, west of Fulu Town, artificial grassland	300	11/8
88-53	E. Dahuricus Turcz.	Heilongjiang, Fuyu, west of Fulu Town, artificial grassland	300	11/8
88-54	Hordeum brevisubulatum (Trin.) Link	Heilongjiang, Fuyu, west of Fulu Town, L. Chinensis steppe	300	11/8
88-55	Agropyron cristatum (Linn.) Gaertn	Heilongjiang, Qiqihar, Shuisheying, District, along the road, under the shrub	280	11/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-56	Leymus chinensis (Trin.) Tzvel.	Heilongjiang, Qiqihar, Shuisheying District, L. chinensis steppe.	280	12/8
88-57	Hordeum brivisubulatum (Trin.) link	Heilongjiang, Qiqihar, Suhisheying District, L. chinensis steppe.	280	12/8
88-58	Elyums cylindricus (Franch.) Honda	Heilongjiang, Qiqihar, Suhisheying District, along the road, under the shrub	280	12/8

88-59	Hordeum brevisubulatum (Trin.) Link	Jilin, Zhenlai, Momoge District, in the lawn.	260	9/8
88-60	Agropyron cristatum (Linn.) Gaertn	Jilin, by 103 km of Highway Baicheng-Qiqihar, in the lawn	260	9/8
88-61	Elymus dahuricus Turcz.	Heilongjiang, Qiqihar, Tiefeng District, meadow steppe	190	13/8
88-62	Leymus chinensis (Trin.) Gaertn	Heilongjiang, Qiqiha, Tiefeng District, meadow steppe	190	13/8
88-63	Elymus cylindricus (Franch.) Honda	Heilongjiang, Qiqihar, Tiefeng District, along the road, under trees	190	13/8
88-64	Agropyron cristatum (Linn.) Gaertn	Heilongjiang, Qiqihar, Zhalong District, on sandhill, under trees	200	13/8
88-65	Roegneria turczaninovii var, macrathera Ohwi	Heilongjiang, Nehe, Green Grassland Animal Farm between grassland and shrub	375	15/8
88-66	Elymus sibiricus Linn.	Heilongjiang, Nehe, Green Grassland Animal Farm between grassland and shrub	375	15/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-67	Elymus cylindricus (Franch.) Honda	Heilongjiang, Nehe, Green Grassland Animal Farm between grassland & shrub	375	15/8
88-68	E. dahuricus Turcz.	Heilongjiang, Nehe, Green Grassland Animal Farm between grassland & shrub	375	15/8
88-69	Roegneria turczanivovii var. macrathera Ohwi	Heilongjiang, Nehe, Bao-an village, between grassland and shrub	300	15/8
88-70	Leyums chinensis (Trin.) Gaertn.	Heilongjiang, Nehe, Bao-an village, between grassland and shrub	300	15/8
88-71	Roegneria turczaninovii var. macrathera Ohwi	Heilongjiang, Nehe, Maoshan Forest Farm beside forest	425	16/8
88-72	Elymus cylindricus (Franch.) Honda	Heilongjiang, Nehe, Maoshan Forest Farm beside forest	425	16/8
88-73	E. sibiricus linn.	Heilongjiang, Nehe, Maoshan Forest Farm beside forest	425	16/8
88-74	Leymus chinensis (Trin.) Gaertn.	Heilongjiang, Nehe, Maoshan Forest Farm beside forest	425	16/8
88-75	Elymus dahuricus Turcz.	Heilongjiang, Nehe, Maoshan Forest Farm beside forest	425	16/8
88-76	E. excelsus Turcz.	Heilongjiang, Nehe, Maoshan Forest	425	16/8

		Farm beside forest		
88-77	Hybrid between L. sibiricus and L. dahuricus	Heilongjiang, Nehe, Green Grassland Animal Farm, along the road	425	no seed
88-78	Hordeum brevisubulatum (Trin.) Link	Heilong, east 2 km to Nehe Town, along the road, under trees	240	16/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-79	Elytrigia repens (linn.) Nevski	Heilongjiang, by 62 km of highway Nenjiang-Mohe, marsh meadow	380	18/8
88-80	Elymus excelsus Turcz.	Heilongjiang, by 62 km of highway Nenjiang-Mohe, along the road	380	18/8
88-81	E. sibiricus Linn.	Heilongjiang, by 62 km of highway Nenjian-Mohe, along the road	380	18/8
88-82	Roegneria turczaninovii var. macrathera Ohwi	Heilongjiang, by 69 km of highway Nenjiang-Mohe, in the lawn	365	18/8
88-83	Elymus cylindricus (Franch.) Honda	Heilongjiang, by 119 km of highway Nenjiang-Mohe, in the lawn	450	18/8
88-84	E. sibiricus Linn.	Heilongjiang, by 119 km of highway Nenjiang-Mohe, in the lawn	450	18/8
88-85	E. dahuricus Turcz.	Heilongjiang, by 119 km of highway Nenjiang-Mohe, in the lawn	450	18/8
88-86	Roegneria turczaninovii var. macrathera Ohwi	Heilongjiang, by 119 km of highway Nenjiang-Mohe, in the lawn	450	18/8
88-87	Roegneria turczaninovii var. macrathera Ohwi	Heilongjiang, by 225 km of highway Nenjiang-Mohe, Guntuling beside forest	700	19/8
88-88	Elymus sibiricus Linn.	Heilongjiang, by 225 km of highway Nenjiang-Mohe, Guntuling beside forest	700	19/8
88-89	E. cylindricus (Franch.) Honda	Heilongjiang, by 225 km of highway Nenjiang-Mohe, Guntuling beside forest	700	19/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-90	E. dahuricus Turcz.	Heilongjiang, by 225 km of highway Nenjiang-Mohe, Guntuling beside forest	700	19/8
88-91	Roegneria turczaninovii var. macrathera Ohwi	Heilongjiang, Nenjiang, by 190 km of highway of Nenjiang-Mohe, in the lawn	530-560	19/8
88-92	Elymus sibiricus Linn.	Heilongjiang, Nenjiang, by 190 km of	530-560	19/8

		highway of Nenjiang-Mohe, in the lawn		
88-93	E. cylindricus (Franch.) Honda	Heilongjiang, Nenjiang, by 190 km of highway of Nenjiang-Mohe, in the lawn	530-560	19/8
88-94	Elytrigia repens (Linn.) Nevski	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
88-95	Elytrigia repens (Linn.) Nevski	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
88-96	Elymus sibiricus Linn.	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
88-97	E. cylindricus (Franch.) Honda	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
88-98	E. dahuricus Turcz.	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
88-99	Leymus chinensis (Trin.) Gaertn.	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
Number	**Species**	**Locality**	**Elevation (m)**	**Coll. date**
88-100	Roegneria turczaninovii var. macrathera Ohwi	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	21/8
88-101	hybrid between E. sibiricus and E. dahuricus	Heilongjiang, the juncture of Nenjiang and Heihe counties, in the lawn beside forest	770	no seed
88-102	Roegneria turczaninuvii var. macrathera Ohwi	Heilongjiang, Nenjiang, Taxi District, in the lawn along the road	550	21/8
88-103	Elymus excelsus Turcz.	Heilongjiang, Nenjiang, Taxi District, in the lawn along the road	550	21/8
88-104	E. Dahuricus Turcz.	Heilong, Nenjiang, Muhe village, between lawn and a shrub	490	21/8