〔植探報 Vol. 6 : P 1 ～22. 1990〕

I - 1 Collection of Millets and Grain Legumes in the Shimoina District of Nagano Prefecture, 1989

Yoshinobu EGAWA[1)], Dhammika SIRIWARDHANE[2)], Kazuhiro YAGASAKI[3)], Hisayoshi HAYASHI[3)], Mitsuo TAKAMATSU[3)], Minoru SAITO[4)], Yoshio NOMURA[5)], Toshiya OKABE[5)], Fumitake IDEZAWA[5)] and *Shoji MIYAZAKI[3)]

1) *National Institute of Agrobiological Resources*, Tsukuba, Ibaraki 305, Japan
2) *Plant Genetic Resources Center*, Gannoruwa, Peradeniya, Sri Lanka
3) *Chushin Agricultural Experiment Station*, Shiojiri, Nagano 399-64, Japan
4) *Nanshin Agricultural Experiment Station*, Shimoina, Nagano 399-31, Japan
5) *Shimoina Agricultural Extension Office*, Shimoina, Nagano 399-35, Japan

Introduction

Crop genetic resources have played an important role in various crop improvement programs as breeding materials. The farmers have cultivated and maintained their crops for a long time. These crops, which are called landraces, successfully adapted to local environments. Local landraces are expected to have a high potential for the development of a broader genetic base useful for future improvement of crops. We can obtain a wide genetic variation from these gene pools.

Local landraces are now confronted with gradual extinction in Japan due to the widespread use of high-yielding varieties, destruction of agricultural land for the construction of buildings, railways and roads and the reduction of the population engaged in agriculture. It is thus very important to pay more attention to the collection and preservation of these valuable genetic resources.

Millets were cultivated extensively more than 40 years ago in Japan. They are, however, now cultivated only in small areas and sporadically. They are the so-called "abandoned crops". Therefore, it is importantnt to collect and preserve local races of millets before extinction. We carried out preliminary field investigations several times in Nagano Prefecture during the summer of 1989. During these investigations, we observed that several kinds of millets are still being cultivated in the southern part of Nagano Prefecture. The present exploration was conducted in the Shimoina district, in the southern part of Nagano Prefecture.

*Present address : *National Institute of Agrobiological Resources*, Tsukuba, Ibaraki 305, Japan

Method

We explored four villages in the Shimoina district of Nagano Prefecture, i. e. Oshika, Kami, Minamishinano and Tenryu villages from October 26th to 29th in 1989. The route of exploration is shown in Table 1 and Fig. 1. We visited farmers' fields and houses and interviewed the farmers to obtain information about their crops, including time of planting and harvest, cultivation practices, local name, agronomic characteristics, usage, and eating habits. Moreover, we asked the farmers how long they had cultivated their crops. We collected seed samples wherever available.

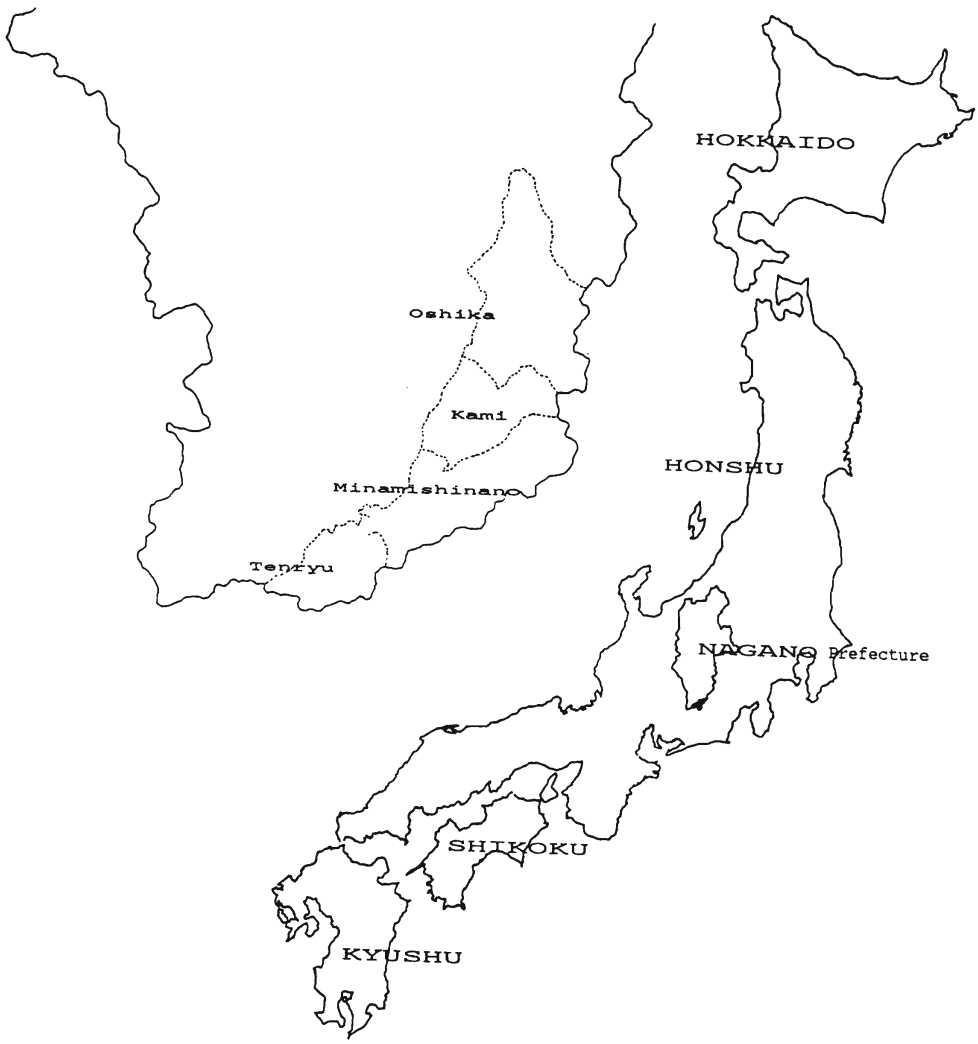

Fig. 1. The route of exploration in Nagano Prefecture.

Table 1. Itinerary of the exploration in the Shimoina district of Nagano Prefecture in 1989

Date	Itinerary	Notes
Oct. 26	Tsukuba -- Chushin Agr. Exp. St. -- Tenryu village (Lodging)	8 accessions from Tenryu village.
Oct. 27	Tenryu village -- Minamishinano village -- Kami village (Lodging).	16 accessions from Tenryu village, 10 from Minamishinano village and 53 from Kami village
Oct. 28	Kami village -- Oshika village (Lodging).	24 accessions from Kami village, 20 accessions from Oshika village.
Oct. 29	Oshika village -- Nanshin Agr. Exp. St. -- NIAR, Tsukuba.	arrangement of accessions at the Nanshin Agr. Exp. Station.

Results and Discussion

Our exploration team collected a total of 131 samples from four villages, including seven species of cereals, five species of grain legumes and perilla as shown in Table 2. The villages which we visited are located in mountainous areas at altitudes between 360m and 1,250m (Table 3). The farmers did not cultivate rice due to the low temperature and the lack of irrigation facilities. They cultivated several kinds of millets, such as sorghum, common millet, Japanese barnyard millet, foxtail millet and finger millet as staple foods. These crops were previously incorporated into shifting cultivation systems as follows : When farmers cleaned the woodland in spring, they planted common millet in the first year, grain legumes (soybean or adzuki bean) in the second year and foxtail millet in the third year. In the summer season, they planted buckwheat in the first year.

Details of each crop with respect to local name, cultural practices, usage and so on, are described below.

Sorghum (*Sorghum bicolor*)

Sorghum is locally called "takakibi" (tall millet) and glutinous varieties are cultivated for the preparation of "mochi" (cake) and "dango" (dumpling). A farmer of Tenryu village explained that the villagers use the red pericarp of sorghum grain to stain chopsticks. Farmers prepare seed beds for sorghum in April and transplant seedlings into fields in mid - May or June. This practice controls the plant height and facilitates harvest. A farmer of Minamishinano village mentioned that the sorghum plant can withstand strong winds.

Table 2. Crop species collected and number of accessions from four villages in the Shimoina district of Nagano Prefecture

Crop species	Tenryu v.	Minami-shinano v.	Kami v.	Oshika v.	Total
1. Cereals:					
Sorghum bicolor	1	1	5	-	7
Panicum miliaceum	2	1	8	2	13
Echinochloa utilis	2	-	3	-	5
Setaria italica	1	1	11	-	13
Eleusine coracana	-	1	1	2	4
Triticum aestivum	-	1	1	-	2
Fagopyrum esculentum	4	1	9	3	17
2. Legumes:					
Glycine max	5	3	12	6	26
Vigna angularis	6	1	8	3	18
Phaseolus vulgaris	2	-	13	5	20
Arachis hypogaea	-	-	1	-	1
Pisum sativum	1	-	1	1	3
3. Other crops:					
Perilla frutescens	-	-	2	-	2
Total	24	10	75	22	131

Common millet (*Panicum miliaceum*)

Common millet is locally called "kokibi" (small millet). The grains of the glutinous varieties are steamed with glutinous rice for pounding into "kibi-mochi". The grains of non-glutinous varieties are boiled with non-glutinous rice to prepare "kibi-gohan" (millet rice). The proportion of rice and common millet used in the mixture is somewhat different among the villagers. Some of them mix rice and common millet in the proportion of 10 to 1 for *kibi-gohan*. A farmer of Kami village told us that the villagers prepare three kinds of mochi cakes from common millet, sorghum and foxtail millet grains during the New Year season. They have a custom of exchanging their mochi cakes with neighbors. According to this farmer, the most delicious one is common millet mochi. Common millet is planted from mid-May to the end of June and harvested in mid-September. In the warmer area, this crop is planted in mid-July after the harvest of Irish potato.

Japanese barnyard millet (*Echinochloa utilis*)

Japanese barnyard millet is called "hie" and its grains are consumed as "hie-gohan" (boiled with non-glutinous rice) and "hie-kohsen" (millet paste). For preparing *hie-gohan*, nine volumes of rice grains are mixed with one volume of barnyard millet grains. Moreover, this crop was once used to make a non-distilled alcoholic beverage called "doburoku". The crop

is planted in mid-May by direct sowing and harvested by the end of November.

Foxtail millet (*Setaria italica*)

We collected glutinous and non-glutinous types of foxtail millet locally called "awa". Glutinous varieties are usually used for "awa-mochi", which is steamed and pounded with glutinous rice in the ratio of 1 to 3 in volume. Non-glutinous varieties are boiled with non-glutinous rice in the ratio of 3 to 7 to make "awa-gohan", The grains of foxtail millet are also used for feeding birds. According to a farmer of Minamishinano village, foxtail millet can tolerate drought.

Finger millet (*Eleusine coracana*)

Finger millet is locally called "kobo-bie". This name was adopted after Kobo-daishi, the name of a famous buddhist monk. The villagers mentioned that Kobo-daishi introduced this crop to save people who experienced famines in older time. Finger millet is also called locally "chosen-bie" (Korean millet) because it is considered to have been introduced from the Korean peninsula. For the cultivation of finger millet, farmers prepare seed beds at the beginning of May and the 30 day old seedlings are transplanted. Finger millet is consumed as millet paste and dumpling. The people cultivated this crop along the roadsides before the roads were paved but now they cultivate it in the fields.

Buckwheat (*Fagopyrum esculentum*)

Buckwheat, locally called "soba", is mainly used for making "soba" (noodles) including preparations such as "soba-dango", "soba-gaki" and "soba-kiri". *Soba-dango* is a dumpling in which adzuki bean paste is stuffed. To prepare *soba-gaki*, buckwheat grains are ground into a fine flour. Then boiled water is poured onto the flour and a paste is made by stirring. The paste is seasoned with soy sauce before eating. Buckwheat seeds are sown from mid-August to the end of September after the harvest of Irish potato and maize. The autumn type varieties are harvested at the end of October.

Soybean (*Glycine max*)

Soybean is locally called "mame" (bean). We collected a total of 26 accessions including varieties with three different grain colours, namely, yellow (the most common type), black or light green varieties. Soybean is commonly used for the preparation of "miso" (soybean paste), "tofu" (soybean curd), "natto" (fermented soybean), "nimame" (boiled bean) and "shoyumame". *Shoyumame* is a semi-fermented food, which is eaten with boiled rice. It is prepared by the following procedures. 1) Dried soybean seeds are heated and divided into two pieces using a

pestle and morter. 2) They are soaked in water overnight and then boiled for three hours. 3) They are dried under sunlight. 4) They are fermented for four to five days using "koji" (malted rice or malted wheat). 5) They are soaked in soysauce for one week. *Shoyumame* is popular in Minamishinano village. Green coloured mature soybean seeds are used as boiled bean locally called "hitashimame". Black testa variety is used as "kuromame", which is a popular traditional food during the New Year season.

For the cultivation of soybean, farmers prepare seed beds and then transplant the crop into fields. This practice aims at minimizing bird damage. The farmers of Oshika village have cultivated a local variety of soybean called "ginjiro" (silver white) for more than 50 years. Compared with the recommended varieties, this local variety displays a late maturity and a low seed shattering habit in the field. Mr. Hiroshi KITAMURA selected one variety from many local races of soybean about 50 years ago. The variety, which is called "nakao-wase", has thin seed testa and, therefore, is suitable for *tofu* production.

Common bean (*Phaseolus vulgaris*)

We collected 20 accessions of common bean. Some varieties are consumed at the young pod stage as green vegetables. Mature seeds are boiled and eaten after being sweetened with sugar. There are two types in terms of growth habit : One is the bush type called "te-nashi" and no "te" (support) is needed for growing the plant. The other is the twining type called "te-ari" and *te* is needed for the growth of the plant.

Adzuki bean (*Vigna angularis*)

Large seeded variety of adzuki bean is called "dainagon" and medium seeded variety "chunagon". Adzuki bean is used to make a paste called "anko", which is prepared after boiling and mixing the bean with sugar. People also prepare "seki-han" (red rice ; boiled rice with red adzuki bean), "shiruko" (which is prepared by pouring hot water onto adzuki bean flour and served by stirring with sugar) and "tateko" from adzuki bean. *Shiruko* and *tateko* are a kind of adzuki bean paste. Normally the crop is planted in mid-June and harvested at the end of October. In Tenryu village, adzuki bean is intercropped with tea plants. By this practice pesticides are applied simultaneously for both crops.

Red-seeded varieties are commonly grown throughout Japan. We were able to obtain a sample of black mottled adzuki bean from Tenryu village (Accession No.890005), which is considered to be a hybrid between cultivated adzuki bean or wild adzuki bean (*V. angularis* var. *nipponensis*). We asked the farmers about the local name of this black mottled adzuki bean by showing them a sample. It was called "kusa-adzuki" (weed adzuki) in Ota, Tenryu village, "nosasa" (wild cowpea) in Hodono, Kami village, "kitsune-adzuki" (fox adzuki) in Kamassawa,

Oshika village, "yama-adzuki" (mountain adzuki) also in Kamassawa, Oshika village, and so on. This black mottled accession is given various names depending upon the people and area, suggesting that hybridization between cultivated adzuki bean and wild adzuki bean may have occurred spontaneously in many places. As mentioned before, shifting cultivation was practised in this district with a combination of adzuki bean or soybean. When planted on mountain slopes in shifting cultivation, adzuki bean may have had the opportunity of being crossed with wild adzuki bean which occurs naturally in the mountains. Black mottled varieties named "kage-adzuki" or "kuro-adzuki" (black adzuki) which are now cultivated in some places are considered to be derived from the hybrid progeny betweeen adzuki bean and wild adzuki bean (EGAWA *et al.* 1986, 1987 ; EGAWA and OKA 1989 ; OKA *et al.* 1989). In the Shimoina district such kinds of black mottled varieties were also cultivated and called "nabe-yogoshi", "kuro-adzuki" or "sato-adzuki" (sugar adzuki). These varieties are considered to be very suitable for "anko" making. We collected two accessions of white adzuki bean. These varieties have thin seed testa, which are suitable for making *anko*.

Other crops

We collected one sample of groundnut (*Arachis hypogaea*) which is used as boiled bean. Two samples of pea (*Pisum sativum*) used as a vegetable were collected from the Kami village.

Perilla (*Perilla frutescens*) is locally called "e" or "ekusa". This crop is sown directly in the field. The seeds have a strong smell. They are roasted and ground with soysauce, and used as a seasoning of baked potato. Shimoguri area of Kami village is famous for "imo-dengaku" (baked potato with a dressing of ground perilla). For this dish, an Irish potato variety named "shimoguri-imo " is used. This variety which bears small round tubers was selected by Mr. Gengo NOMAKI of Kami village as a late maturing and high-yielding variety from the early maturing local varieties more than 50 years ago. The selection of the late maturing variety enables to harvest the crop after the rainy season. This potato variety is planted in mid-March and harvested in mid-July.

General Comments

Old men and women were engaged in farming in every village we visited. We could observe how they cultivate and maintain different crops which they need for daily consumption. Soybean, adzuki bean, common bean and some vegetables are cultivated in almost every farmers' field. Even though farmers were busy farming, they kindly provided us with information and knowledge on their crops. They were willing to talk about their traditional foods, cultivation practices and customs.

Many local varieties of millets and grain legumes are well maintained by farmers in the Shimoina district of Nagano Prefecture. We also obtained some information on the intensive selection of local varieties by local farmers. It is very important to explore this district further, collect local landraces and evaluate them.

Acknowledgements

We would like to thank all the farmers we met in the Tenryu, Kami, Minamishinano and Oshika villages for their kind cooperation and for their willingness to provide seeds and share their valuable time with us. We should also be grateful to Mr. Fumihiro FUJITA and Mr. Tsuguo YOSHIDA, the National Institute of Agrobiological Resources, Tsukuba, Japan for their careful driving and assistance throughout the course of this exploration.

Literature Cited

1) EGAWA, Y., T. NAGAMINE and M. NAKAGAHRA 1986. Collection of crop genetic resources in Japan, 1985. Ann. Rep. Natl. Inst. Agrobiol. Resources. 2 : 19-20.

2) EGAWA, Y., T. NAGAMINE and M. NAKAGAHRA 1987. Collection of millets and grain legumes in northern part of Ibaraki and southern part of Fukushima Prefectures. Natl. Inst. Agrobiol. Resources (ed.). Ann. Rep. Plant Genetic Resources Exploration. 3 : 1-17. (in Japanese)

3) EGAWA Y. and M. OKA 1989. Collection of crop genetic resources in Minami-aidzu district of Fukushima Prefecture, 1989. Natl. Inst. Agrobiol. Resources (ed.). Ann. Rep. Plant Genetic Resources Exploration. 5 : 21-33. (in Japanese)

4) OKA, M., T. NAGAMINE, Y. EGAWA, M. KATSUTA and M. NAKAGAHRA 1989. Collection of crop genetic resources in the central part of Japan in 1987. *In* "Exploration and collection of plant genetic resources part Ⅰ." JICA. 119-136.

Table 3. Materials collected during the exploration in the Simoina district of Nagano Prefecture

Coll. No.	Crop name	Species name	Local name	Coll. date
890001	soybean	*Glycine max*	unknown	26 Oct.
890002	〃	〃	〃	〃
890003	buckwheat	*Fagopyron esculentum*	akisoba	〃
890004	〃	〃	〃	〃
890005	adzuki bean	*Vigna angularis*	unknownn	〃
890006	〃	〃	dainagon	〃
890007	soybean	*Glycine max*	unkown	〃
890008	common millet	*Panicum miliaceum*	kokibi	〃
890009	barnyard millet	*Echinochloa utilis*	chikubie	27 Oct.
890010	sorghum	*Sorghum bicolor*	takakibi	〃
890011	adzuki bean	*Vigna angularis*	dainagon	〃
890012	soybean	*Glycine max*	daizu	〃
890013	barnyard millet	*Echinochloa utilis*	chinkoro	〃
890014	common bean	*Phaseolus vulgaris*	ingen	〃
890015	〃	〃	〃	〃
890016	common millet	*Panicum miliaceum*	kokibi	〃
890017	foxtail millet	*Setaria italica*	mochiawa	〃
890018	adzuki bean	*Vigna angularis*	azuki	〃
890019	〃	〃	buchiazuki	〃
890020	〃	〃	dainagon	〃
890021	soybean	*Glycine max*	mame	〃
890022	〃	〃	daizu, mame	〃
890023	〃	〃	〃	〃
890024	foxtail millet	*Setaria italica*	mochiawa	〃
890025	〃	〃	〃	〃
890026	〃	〃	〃	〃
890027	〃	〃	〃	〃
890028	adzuki bean	*Vigna angularis*	azuki	〃
890029	common millet	*Panicum miliaceum*	inakibi	〃
890030	common bean	*Phaseolus vulgaris*	sasagi	〃

Locality (altitude ; m)	Notes
Shimoyama, Tenryu (360m)	sown in early June ; used for "miso" making
〃	sown in early June ; used for "miso" making
〃	sown from 20 Aug. to end of Sept ; harvested on 25 Oct.
〃	25 Aug. to 25 Oct ; used for "soba-dango" or "soba-gaki"
〃	hybrid between adzuki bean and var. *nipponensis* ?
〃	cultivated for about 30 years
〃	season : 10 June to 10 Nov.; brown hairs on pod ; plant height 60cm
Nakaizamurai, Tenryu	boiled with rice ; introduced from Shizuoka 7-8 years ago
Tochu, Tenryu (600m)	growing season : early May to end Oct. ; boiled with rice
〃	transplanted to control plant height
〃	seeds sown in early June
〃	
Ota, Tenryu	
〃	white seed testa
〃	red seed testa
〃	boiled with rice ; pounded into "mochi" with glutinous rice
〃	round-shaped spike
〃	large-seeded variety ; straw-coloured pods
〃	good taste ; "Anego" variety (a white and red seed testa)
Hodono, Kami (830m)	sown in mid-June ; used for "anko", straw-coloured pods
〃	sown on 20 May ; provided by neighbors
〃	early May to 20 Oct. ; transplanted to control bird damage
〃	brown hilum ; used for "miso" or "shoyumame"
〃	early May to early Oct. ; used for "mochi" ; plant height 120cm
〃	small and slender spike
〃	medium-sized spike
〃	large spike
〃	
〃	sown from mid-May to end of June ; harvested in Sept. ; kibi-gohan
〃	season : early May to Aug. ; erect growth type

Coll. No.	Crop name	Species name	Local name	Coll. date
890031	common bean	*Phaseolus vulgaris*	yabu	27 Oct.
890032	buckwheat	*Fagopyrum esculentum*	akisoba	〃
890033	common millet	*Panicum miliaceum*	kokibi	〃
890034	foxtail millet	*Setaria italica*	mochiawa	〃
890035	common millet	*Panicum miliaceum*	takakibi	〃
890036	common bean	*Phaseolus vulgaris*	sasagi	〃
890037	〃	〃	ingen	〃
890038	〃	〃	〃	〃
890039	adzuki bean	*Vigna angularis*	azuki	〃
890040	soybean	*Glycine max*	daizu	〃
890041	perilla	*Perilla frutescens*	egoma	〃
890042	buckwheat	*Fagopyrum esculentum*	soba	〃
890043	soybean	*Glycine max*	daizu	〃
890044	foxtail millet	*Setaria italica*	mochiawa	〃
890045	sorghum	*Sorghum bicolor*	takakibi	〃
890046	common millet	*Panicum miliaceum*	kokibi	〃
890047	finger millet	*Eleusine coracana*	kobobie	〃
890048	buckwheat	*Fagopyrum esculentum*	soba	〃
890049	adzuki bean	*Vigna angularis*	dainagon	〃
890050	soybean	*Glycine max*	kuromame	〃
890051	〃	〃	mame	〃
890052	wheat	*Triticum aestivum*	komugi	〃
890054	finger millet	*Eleusine coracana*	kobobie	〃
890055	foxtail millet	*Setaria italica*	mochiawa	28 Oct.
890056	〃	〃	uruawa	〃
890057	barnyard millet	*Echinochloa utilis*	hie	〃
890058	buckwheat	*Fagopyrum esculentum*	soba	〃
890059	common millet	*Panicum miliaceum*	kokibi	〃
890060	〃	〃	〃	〃
890061	sorghum	*Sorghum bicolor*	takakibi	〃

Locality (altitude ; m)	Notes
Hodono, Kami	harvested in mid-Aug. ; twining type ; pod used as vegetables
〃 (800m)	end of July or mid-Aug. to early Oct.
Nakagou, Kami (700m)	sown from the end of April to mid-June ; harvested in mid-Aug.
〃	harvested at the end of September
〃	transplanted in mid-May
〃 (680m)	pod used as green vegetable
〃	pod used as green vegetable
〃	pod used as green vegetable
Shimokurizawa, Kami (980m)	
〃	
〃	May to end of Oct. ; used for seasoning
〃	
Kaminakane,Minamishinano (960m)	sown on 20 May ; transplanted ; white hairs on pods
Kizawa, Minamishinano (960m)	early June to end Sept. ; direct sowing ; resistant to drought
〃	sown on 2nd May ; transplanted in early June ; for "mochi" or "dango"
〃	5 May to mid-Sept. ; direct sowing,
〃	sown on 2 May ; transplanted 1 month later ; high-yielding crop
〃	sown until 10 Aug. ; harvested at the end of Sept.
〃	
〃	direct sowing
〃	processed for miso or shoyumame
〃	malted wheat for making shoyumame ; improved variety ?
Shimoguri, Kami (1060m)	many tillers ; thin paricarp ; easy to thresh
〃	season : 10 May to early Oct. ; direct sowing ; compact spike
〃	10 May to early Oct. ; no tillers
〃	used to produce an alcoholic beverage called "doburoku" ; "hiegohan"
〃	sown before harvest of potato ; 60 days to maturity
〃	
〃	brown seed testa ; small grain
〃	steamed with glutinous rice to make mochi

Coll. No.	Crop name	Species name	Local name	Coll. date
890062	perilla	*Perilla frutescens*	e	28 Oct.
890063	adzuki bean	*Vigna angularis*	chunagon	〃
890064	common millet	*Panicum miliaceum*	kokibi	〃
890065	〃	〃	〃	〃
890066	buckwheat	*Fagopyrum esculentum*	soba	〃
890067	adzuki	*Vigna angularis*	shiroazuki	〃
890068	common bean	*Phaseolus vulgaris*	shirosasage	〃
890069	〃	〃	kaimame	〃
890070	soybena	*Glycine max*	nakaowase	〃
890101	buckwheat	*Fagopyrum esculentum*	soba	27 Oct.
890102	adzuki bean	*Vigna angularis*	unknown	〃
890103	sesame	*Sesamum indicum*	goma	〃
890104	buckwheat	*Fagopyrum esculentum*	soba	〃
890105	soybean	*Glycine max*	daizu	〃
890106	common millet	*Panicum miliaceum*	kokibi	〃
890107	awa	*Sataria italica*	mochiawa	〃
890108	daizu	*Glycine max*	wasemame	〃
890109	buckwheat	*Fagopyrum esculentum*	soba	〃
890110	barnyard millet	*Echinochloa utilis*	higenashihie	〃
890111	adzuki	*Vigna angularis*	azuki	〃
890112	sorghum	*Sorghum bicolor*	takakibi	〃
890113	common bean	*Phaseolus vulgaris*	hotaka	〃
890114	soybean	*Glycine max*	hitashimame	〃
890115	〃	〃	daizu	〃
890116	adzuki bean	*Vigna angularis*	shiroazuki	〃
890117	〃	〃	azuki	〃
890118	common bean	*Phaseolus vulgaris*	unkown	〃
890119	buckwheat	*Fagopyrum esculentum*	soba	〃
890120	barnyard millet	*Echinochloa utilis*	higenashihie	〃
890121	pea	*Pisum sativum*	chikunoboendo	〃

Locality (altitude ; m)	Notes
Shimoguri, Kami (1060m)	for seasoning mochi and "imodengaku"
kamassawa, Oshika (1000m)	season : 20 May to mid-Oct. ; cultivated for about 20 years
〃	season : 20 May to end of Sept. ; white seed testa
Kashio, Oshika	sown in early May ; brown pericarp
〃	season : early Aug. to 10 Oct. ; brown pericarp
Oguri, Kashio, Oshika	10 June to 20 Oct. ; cultivated since Meiji era ; for "anko"
〃	10 June to mid-Oct. ; used as boiled bean
〃	introduced from Hokkaido
Nashihara, Oshika	selected by Mr. Hiroshi KITAMURA among landraces ; for "miso"
Nakaizamurai, Tenryu (370m)	season : 27 Aug. to early Nov.
〃	sown on 10 July ; intercropped with tea plants ; for about 10 years
〃	end of June-early July to early Oct. ; for 10-15 years
Sakabe, Tenryu (680m)	season : 4 Aug. to 22 Oct.
〃	sown on 13 June ; for miso, tofu and kinako ; large-seeded variety
Hodono, Kami (870m)	May to end Sept. ; for mochi ; cultivated for about 100 years
〃	May to mid-Oct. ; for mochi ; cultivated for about 100 years
〃	20 May to end of Oct. ; for miso ; cultivated for about 100 years
〃	autumn type variety ; sown until 10 Aug. ; harvested in early Oct.
〃	for dango or feeding birds ; cultivated for about 100 years
〃	end May-June to mid-Oct. ; for anko making ; for about 100 years
〃	sown in April ; transplanted ; harvested in early Oct.
〃	April to Aug. ; cultivated for about 20 years
〃	20 May to early Nov. ; transplanted to control bird damage
〃	mid-May to end of Oct. ; transplanted
〃	end May to mid-Oct. ; high-yielding variety
〃	red seed testa ; medium-seeded variety
〃	sown in May ; pod consumed as green vegetable
〃	sown after harvest of maize or potato (20 Aug.)
〃	used for feeding birds
〃	sown at the end Oct. or on 20 March ; harvested from May to June, dwarf type

Coll. No.	Crop name	Species name	Local name	Coll. date
890122	soybean	*Glycine max*	daizu	27 Oct.
890123	buckwheat	*Fagopyrum esculentum*	soba	〃
890124	〃	〃	〃	〃
890125	common millet	*Panicum miliaceum*	kokibi	〃
890126	〃	〃	〃	〃
890127	foxtail millet	*Sataria italica*	mochiawa	〃
890128	soybean	*Glycine max*	daizu	〃
890129	finger millet	*Eleusine coracana*	kouboubie	〃
890130	buckwheat	*Fagopyrum esculentum*	soba	〃
890131	common bean	*Phaseolus vulgaris*	tenbou	〃
890132	pea	*Pisum sativum*	chikuendo	〃
890133	groundnut	*Arachis hypogaea*	zimame	〃
890134	potato	*Solanum tuberosum*	jyagaimo	〃
890135	adzuki bean	*Vigna angularis*	dainagon	〃
890136	〃	〃	chunagon	〃
890137	common bean	*Phaseolus vulgaris*	tsurusasage	〃
890138	〃	〃	〃	〃
890139	〃	〃	〃	〃
890140	〃	〃	narikura	〃
890141	〃	〃	kintoki	〃
890142	soybean	*Glycine max*	kuromame	〃
890143	〃	〃	shiromame	28 Oct.
890144	〃	〃	yudoshimame	〃
890145	sorghum	*Sorghum bicolor*	takakibi	〃
890146	〃	〃	〃	〃
890147	foxtail millet	*Setaria italica*	mochiawa	〃
890148	〃	〃	saka	〃
890149	finger millet	*Eleusine coracana*	kobobie	〃
890150	buckwheat	*Fagopyrum esculentum*	soba	〃
890151	wheat	*Triticum aestivum*	komugi	〃

Locality (altitude ; m)	Notes
Nakagou, Kami (870m)	season : early June to early Nov. ; used for tofu and miso making
〃	season : end July to 20 Sept. ; large-seeded variety
Shimoguri, Kami (980m)	autumn type variety ; sown 10-15 Aug. ; harvested on 10 Oct.
〃	mid-May to early Sept. ; sown after harvest of potato or maize
〃	season : mid-May to mid-Aug.
〃	used for mochi and porridge ; cultivated for about 50 years
Shimoguri, Kami (990m)	season : early May to 20 Oct. ; transplanted ; early maturity var.
〃	once cultivated along roadsides ; used for dango making
〃	season : end of July-early Aug. to early Oct. ; brown pericarp
〃	sown after harvest of potato ; cultivated for about 50 years
〃	early Nov. to early June ; erect growth type ; for about 50 years
〃	early May to end of Oct. ; introduced from Minamishinano vill.
〃	planted in mid-March ; harvested in mid-July ; for about 50 years
Shimoguri, Kami (930m)	season : 25 June to end of Oct.
〃	25 June to end of Oct. ; cultivated for about 10 years
〃	mid-May to Oct. ; twining growth type ; for about 40 years
〃	mid-May to Oct. ; tender pod ; cultivated for about 40 years
〃	mid-May to Oct. ; cultivated for about 40 years
〃	sown from April to end of May ; harvested from July to end of Aug. ; high-yielding, tender pod
〃	early May to early Aug.
〃	early June to early Nov. ; late maturing type ; large-seeded
〃	sown on 10 June ; transplanted ; harvested on 20 Oct.
〃	sown from the end of May-early June ; transplanted ; harvested in early Nov.
〃	season : early May to mid-Sept. ; plant height about 2m
〃	season : early May to mid-Sept. ; plant height about 2.5m
〃	season : mid-May to mid-Sept. ; cultivated for 5-6 years
〃	season : mid-May to mid-Sept.
〃	once used as staple food ; cultivated for more than several decades
〃	1st Aug. to mid-Sept. ; cultivated for about 100 years
〃	end of Oct. to June ; once intercropped with soybean

Coll. No.	Crop name	Species name	Local name	Coll. date
890152	common millet	*Panicum miliaceum*	kokibi	28 Oct.
890153	soybean	*Glycine max*	nakaowase	〃
890154	〃	〃	kuromame	〃
890155	〃	〃	daizu	〃
890156	common bean	*Phaseolus vulgaris*	shimosasagi	〃
890157	〃	〃	〃	〃
890158	〃	〃	〃	〃
890159	soybean	*Glycine max*	ginjiro	〃
890160	adzuki bean	*Vigna angularis*	chunagon	〃
890161	soybean	*Glycine max*	aobato	〃
890162	buckwheat	*Fagopyrum esculentum*	soba	〃
890163	〃	〃	〃	〃
890164	potato	*Solanum tuberosum*	jyagaimo	〃

Locality (altitude ; m)	Notes
Shimoguri, Kami (930m)	season ; 12 June to 13 Sept. ; cultivated for about 10 years
Okawahara, Oshika (1000m)	25 May to end of Oct. ; selected from landraces about 60 years ago
〃	25 May to end of Oct. ; cultivated for 15-16 years
〃	20 May to 16 Oct. ; white hairs ; large and light green seed
Okawahara, Oshika (1000m)	pod used as green vegetable
〃	pod used as green vegetable
〃	pod used as green vegetable
Irisawai, Oshika (1150m)	27 May to 20 Oct. ; miso, boiled bean or tofu ; for about 50 years
〃	season : 27 May to 20 Oct. ; cultivated for about 30 years
〃	27 May to end of Oct. ; used for kinako making
Kashio, Oshika (1250m)	10 Aug. to mid-Oct. ; cultivated for about 100 years
〃	3 Aug. to mid-Oct.
Nokimatu, Kami (1238m)	20 March to end of July-early Aug. ; selected among landraces

長野県下伊那郡における雑穀類と豆類の探索収集

江川　宜伸[1)]・Dhammika SIRIWARDHANE[2)]・矢ケ崎和弘[3)]・林　久喜[3)]・
高松　光生[3)]・斎藤　稔[4)]・野村　義郎[5)]・岡部　俊也[5)]・
出澤　文武[5)]・*宮崎　尚時[3)]

[1)] 農林水産省農業生物資源研究所・遺伝資源第一部・植物探索導入研究チーム

[2)] スリランカ国植物遺伝資源センター

[3)] 長野県中信農業試験場畑作育種部

[4)] 長野県南信農業試験場栽培部

[5)] 長野県下伊那郡農業改良普及所

要　約

農家の人々は，長年にわたってその土地の気候に適した在来品種を栽培し，維持してきた。しかし，高収量品種の導入，農地の破壊，農業従事者数の減少等の理由で，作物在来品種は現在消滅の危機に直面しており，その収集保存は緊急の課題である。

長野県中信農試を中心とした数度の予備調査の結果，静岡県との県境に位置する長野県下伊那郡は，シコクビエ，アワ，ヒエなどの雑穀をはじめ，多くの豆類在来種が栽培されていることが判明した。そこで，平成元年10月26日から29日までの４日間，下伊那郡の天竜村，南信濃村，上村，大鹿村で遺伝資源の探索収集を行なった。現地は，険しい山間地であり，低温のため稲は栽培されず，主食としてアワ，キビ，ヒエ，モロコシ，シコクビエのような雑穀類が栽培されてきた。またかつて雑穀と豆類を含む焼畑農耕が行なわれていた。

今回の探索により，上述の４村から131点の作物在来種を収集した。以下に各作物についての情報を簡潔に述べる。

モロコシは，タカキビと呼ばれる。草丈をおさえ，収穫を容易にするため移植栽培を行なう。キビは，コキビの地方名で呼ばれる。キビモチやキビ御飯に利用する。ヒエは，移植せず，５月中旬に直播し11月下旬に収穫する。シコクビエは，コウボウビエまたはチョウセンビエと呼ぶ。５月初めまでに播種し，30日苗を移植する。かつては道路沿いにびっしり栽培されていたという。ソバは，ジャガイモやトウモロコシの収穫後，８月中旬から９月末に播種し，10月末に収穫する。ダイズは合計26点収集した。鳥害を回避するため移植栽培を行なう。大鹿村では銀白と呼ばれる在来種が50年以上栽培されている。これは奨励品種に比べてやや晩生で圃場で裂莢することがないという。アズキは，赤い種皮の品種が普通であるが，シロアズキ２点と姉子１点を収集した。また，アズキとヤブツルアズキの雑種後代と考えられる小さく細い黒斑種も収集した。この黒斑種の呼び名は，地域ごと農家ごとに異なり，クサアズキ，ノササ，キツネアズキ，ヤマアズキなど様々であった。このことは，野生アズキとアズキの自然交配が当地

＊　現　農業生物資源研究所

のあちこちで生じていることを示す。エゴマはエとかエクサと呼ばれ，ジャガイモにまぶして利用する。下栗イモと呼ばれる小粒で晩生の在来種が上村で選抜され，イモ田楽用に利用されていた。

以上述べたように，長野県下伊那郡の４つの村では雑穀類，豆類がよく保存されている。また篤農家が在来種の中から，特に当地に適した品種を選抜し維持してきている。今後探索調査を継続していくとさらに在来種の収集が期待できる。