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日本における作物近縁野生種の保存：*Vigna* 属 6．四国の探索 1998 年 10 月 23 日～ 10 月 30 日

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Wild relatives of crops conservation in Japan with a focus on *Vigna* spp. 6．Collecting mission on Shikoku. 23rd-30th October 1998

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摘要

日本に自生する作物近縁野生種の代表として野生アズキと野生ダイズの生育地点を調査し，遺伝資源を収集するための探索を四国で行った。調査は，1998 年 10 月 23 日から 30 日にかけて行った。四国の瀬戸内海側ではほとんど野生アズキ，野生ダイズ集団を発見できず，この地域ではこれら両種の生育密度が低いことが判明した。これに対し，四国の南側では両種の生育密度は高く，数地点の両野生種生育地を発見できた。四国では雑草アズキは発見できなかった。高知県でササゲのエスケープ集団を発見した。数人の農民からの聞き取りによると以前はツルアズキ（タケアズキ，*V. umbellata*）を栽培していたが，現在は栽培しなくなったという。

本探索によって，27 点の植物遺伝資源を収集した。野生アズキ 5 集団，野生ダイズ 4 集団からは個体別に種子を収集した。ほとんどの集団から根粒を収集し，植物標本を作成した。

Summary

Wild legume genetic resources were the focus of a collecting trip to Shikoku(四国) between the 25th to 31st October, 1998. Collecting wild *Vigna* and soybeans on Shikoku(四国) was notable for the near absence of wild *Vigna* and wild *Glycine* on the north of the island. Only one population of each species was found near Matsuyama (松山) Ehime(愛姫県). However, in southern Shikoku(四国) small populations of both wild *Vigna* and wild *Glycine* were common in all areas visited. The reasons for these differences are not clear but may be due to climate, urban development or other environmental differences between the north and the south of Shikoku(四国). Weedy and complex populations of *Vigna* were not found on Shikoku(四国). However, in one location near Koochi(高知) escaped cowpea (*Vigna unguigulata*) was found.

In conversations with several farmers it was learned that Takeazuki (*Vigna umbellata*) was grown some years ago but was no longer grown. We did not find or hear of *Vigna umbellata* being currently grown during

the trip.

A total of 27 populations were collected in addition 96 single plant samples were collected from 5 populations of *Vigna angularis* var. *nipponensis* and 4 populations of *Glycine soja* (Table below). In most cases herbarium specimens and root nodules were also collected

収集品のリスト

Species	Number of populations (plants) sampled
Vigna angularis var. *nipponensis*	9(56)
V. angularis (cultigen)	1
V. unguiculata (cultigen)	1
V.unguiculata (escape)	1(10)
Glycine soja	14(40)
Oryza sativa	1

KEYWORDS: Wild legume genetic resources, *Vigna* spp., *Glycine soja*

Field observations 探索経路と収集地での情報

The collecting mission started in Marugame(丸亀), Kagawa (香川県) and traveled west to Matsuyama (松山), Ehime (愛姫県). The mission then traveled down the mountainous western side of Shikoku as far as Nakamura(中村) Kochi (高知県) and then traveled the southern coast to Kochi(高知市). From Kochi(高知市) the mission traveled back to the north side of Shikoku(四国) travelling as far east as Shirotori(白鳥) (Map 1). Only relatively small areas of the north and south coast are low lying the rest of Shikoku(四国) is characterized by high mountains between which are small farming valleys. The road system in the northeast, from Marugame(丸亀) to Matsuyama(松山) and Marugame(丸亀) to Koochi(高知) is very good with a modern toll road system in place. However, in other parts particularly in the west of Shikoku roads are not good and in some places are only a single lane in the mountains.

Despite careful observations in northern Shikoku(四国) the collecting team only found *Vigna angularis* var *nipponensis* and *Glycine soja* in one location growing together just south of Matsuyama(松山) at Iyo(伊予). The habitat was on both sides of a river levee and the population spread over several hundred meters. The team did not find wild or weedy *Vigna angularis* along the northeast coast which may be a reflection of this area being heavily built up.

In the mountains between Matsuyama(松山) and Nakamura(中村) only *G. soja* was found. A wild population of *Vigna angularis* was found at Kawanobori(川登), Nakamura(中村) (CED98108, site no. 173, 174). Subsequently at each place the team stopped along the south coast of Shikoku(四国) both *Vigna angularis* var. *nipponensis* and *Glycine soja* were easily found. Along the southern coastal region of Kochi prefecture (高知県) *V. angularis* was found in a variety of habitats. Some habitats, such as the grassy edges of a paddy field seemed to be relatively stable and perhaps subject only to cutting during the year. Other habitats were

much more disturbed and in one location, Suzaki-shi (須崎市） Kochi (高知県), the population was being covered by dumped soil from a road construction project. At one location, Kamiyasu(上夜須), Yasu(夜須), Kochi (高知県) (CED98125) many plants of one population of wild azuki (*V. angularis* var. *nipponensis*)was found to be at a different growth stage compared to other populations in the area. On inquiry of local residents we learned that the area had been severely flooded during the summer and thus it is presumed that these plants had germinated after the floods had receded.

The striking contrast between the north and south coasts of Shikoku(四国) was not expected. It seems most likely that the lower human population in southern Shikoku may be the main reason for the abundance of both wild azuki and wild soybean. Another possible reason may be the climatic differences between the north and south of Shikoku(四国).

The habitats of *Vigna angularis* var. *nipponensis* were generally sloping ground between fields and roads, river levees or waste land. Commonly associated plants included *Solidago altissima, Setaria* spp., *Amphicarpaea bracteata, Glycine soja* and other species of disturbed habitats. In general, populations of *Vigna angularis* var. *nipponensis* were rather small consisting of less than 50 plants.

Escaped cowpea (*V. unguiculata*) was found in only one location, Ino-machi-minami(伊野町南), Ino（伊野）, Kochi (高知県) on waste land growing with both wild azuki and wild soybean (*G. soja*). As with populations of this escaped cultigen found in Kyushu （九州） plants were vigorous, appeared to have high seed production and very dark green disease free leaves. Seed color was black.

Comments of farmers 農民からの情報

Ehime-ken(愛媛県)

We were told that a small seeded bean (generally called yabutsuru azuki which means bush twining azuki) is locally called Kage azuki (Kage 影 meaning shadow) used to grow around rice paddies and was harvested particularly after World War 2. This bean had yellow flowers and seeds were brown. These beans gradually disappeared because of changes to rice paddies and the use of herbicide, we were told. These small seeded beans are no longer to be found in the area according to the farmer. Since these were apparently not planted and used in a time when food was scarce it is possible that this was wild or weedy azuki bean.

Kochi-ken(高知県)

In this region they call small seeded beans (yabutsuru azuki) which grow in mountains are locally called yama azuki (Yama 山 meaning mountain). They are smaller than cultivated azuki. People harvest and used them in autumn, but these beans are not now found. It seems likely that yama azuki refers to weedy *V. angularis*.

Another farmer told the collecting team ame azuki was cultivated until the year Showa 40 (1965). This plant is easier to grow than cultivated azuki and grows well even during seasons with a lot of rainfall. However, the eating quality is inferior to the cultivated variety. The harvest area gradually decreased. Ame azuki had a long oval shape and the color was that of cultivated azuki. Ame azuki may be the same as *Vigna umbellata*.

The only part of coastal Shikoku(四国) not visited was the eastern part. The coastal plain in that area is almost non-existent with steep cliffs going down to the sea. Yoshino Kawa （吉野川） valley and adjacent areas in Tokushima prefecture (徳島県) is the one area in Shikoku not visited which may have many populations of wild *Vigna* and *Glycine*. Time prevented the team visiting the area and an opportunity in the future to visit the area should be sought.

Between Shikoku(四国) and Honshu(本州) is an island called Shodoshima (小豆島azuki island) Kagawa prefecture (香川県). We have not visited the island. When the opportunity arises these islands should be visited and explored for wild azuki.

Table 1 Itinerary of the exploration and the collected samples on each day
探索収集日程と収集品の数

Date 日付	Itinerary and collection sites number 行程と収集地点番号	Collected species and number of accessions 収集した種と系統数
10/25 (Sun)	Kagawa Marugame Ehime Niihama 香川 県 丸亀 市 --- 愛媛 県 新居浜 市 --- Saijo Masaki Iyo 西条市--- 松前 市 --- 伊予市 ---167 --- Matsuyama 松山 市	*V. angularis* var. *angularis* 1 *V. agnguralis* var. *nipponensis* 1 *Glycine soja* 1
10/26 (Mon)	Matsuyama Futami Nagahama 松山 市 --- 双海 町 --- 長浜 町 --- Ozu 大洲市 Uwa Yoshida --- 宇和町 --- 168, 169 --- 吉田 町 --- 170--- Uwajima 宇和島 市 --- 171	*Glycine soja* 3 *O.sativa* 1
10/27 (Tue)	Uwajima Hiromi Kouchi Nakamura 宇和島 市 --- 広見 町 --- 高知 県 中村 市 Ogata --- 172, 173, 174 --- 大方 町 --- 175, 176 --- Nakatosa Susaki 中土佐 市 ---177 --- 須崎 市	*V. angularis* var. *nipponensis* 3 V. unguiculata 1 *G. soja* 5
10/28 (Wed)	Susaki Tosa Haruno 須崎 市 --- 178 --- 土佐市 --- 春野 町 --- 180 - Nangoku Yasu -- 南国 市--- 181 --- 夜須町 --- 182 --- Kouchi 高知 市	*V.angularis* var. *nipponensis* 5. *V.unguiculata* 1 *G. soja* 5
10/29 (Thurs)	Kouchi Kagawa Takamatsu Tsuda 高知 市 --- 香川 県 高松 市 --- 津田 町 - Shiratori Takamatsu -- 白鳥 町 --- 高松 市	
10/30 (Fri)	Takamatsu 高松 市	
	Total	*V. angularis* var. *angularis* 1 *V. angularis* var. *nipponensis* 9 *Glycine soja* 14 *O. sativa* 1 *V. unguiculata* 2 Total : 27 samples from15 sites

Table 2　A list of collected samples in Shikoku,1998

四国で収集した作物近縁野生種遺伝資源，1998

No.	Month /date	Site No.	Col.No.	Acc.No.	Genus & Species	Status	Locality			Latitude Longitude	Alt.	Topography	Shading	Degree of disturbance	Population size	Growth stage	Seed samples	Nodule samples	Specimens	Characteristics and notes	Associated plants
							Prefecture	District	Village												
101	10/24	167	CED98100	03032400	*Vigna angularis*	wild	Ehime 愛媛県	Iyo 伊予市	Ootani 大谷	33°46'15.2" N /132°42'48.9" E	10m	plain below mountain	open	med	scattered over 3ha	mature	10 + bulk	yes	3	most plants from river levee, adjacent to fields waste land, growing with *G.soja* in places, pod color black + brown	*Solidago altissima*, *Miscanthus sinensis*, Grasses
102	10/24	167	CED98101	03032475	*Glycine soja*	〃	〃	〃	〃	33°46'15.2" N /132°42'48.9" E	10m	〃	〃	〃	scattered over 2ha		10 + bulk	yes	2	between cult rice fields to river, less abundant than wild azuki	*Solidago altissima*, *Miscanthus sinensis*, Grasses
103	10/24	167	CED98102	03032431	*Vigna angularis*	cultivated	〃	〃	〃	33°46'15.2" N /132°42'48.9" E	10m	〃	〃	high	3row × 20m=60m^2	mature	bulk	no	0		
104	10/24	168	CED98103	03032476	*Glycine soja*	wild	〃	Uwa 宇和町	Shimomatuba 下松葉	33°22'54.8" N /132°30'00.6" E	64m	plain in mountain	〃	〃		〃	10 + bulk	yes	3	leaves oval, many pods immature	*Solidago altissima*, *Miscanthus sinensis*
105	10/26	169	CED98104		*Oryza sativa*	cultivated	〃	〃	Akashi 明石	33°22'08.9" N /132°31'45.5" E	?	Mountains		〃	most of field harvested	〃	bulk	no	0		rice field
106	10/26	170	CED98105	03032477	*Glycine soja*	wild	〃	Yoshida 吉田町	Chinaga 知永	33°15'57.1" N /132°33'21.5" E	?	〃	open	〃	scattered 2ha	〃	bulk	no	0	waste land, formerly field	*Solidago altissima*, *Kiwi fruit*
107	10/26	171	CED98106	03032478	〃	〃	〃	Uwajima 宇和島市	Iwafuzi 岩蕗	33°11'18.5" N /132°32'45.6" E	ca. 0m	between hills	〃	〃	20m^2	immature	bulk	yes	4	adjacent to fields	*Solidago altissima*
108	10/27	172	CED98107	03032479	〃	〃	Kochi 高知県	Nakamura 中村市	Kawanobori 川登	33°03'06.0" N /132°49'16.5" E	?	Mountains	〃	〃		mature	bulk	no	0		*Solidago altissima*
109	10/27	173	CED98108	03032401	*Vigna angularis*	〃	〃	〃	〃	33°01'47.0" N /132°51'28.5" E	?	〃	〃	〃	scattered 100m^2	〃	10 + bulk	yes	3		*Solidago altissima*, *Setaria* spp.
110	10/27	173	CED98109	03032480	*Glycine soja*	〃	〃	〃	〃	33°01'47.0" N /132°51'28.5" E	?	〃	〃	〃	over 3ha a lot in the area	〃	bulk	no	0	bushes next to rice field	*Solidago altissima*
111	10/27	174	CED98110	03032481	*Glycine soja*	〃	〃	〃	古津賀	32°59'02.6" N /132°57'36.5" E	ca. 0m	plain	〃				bulk	yes	1 (98111+110-1)		*Solidago altissima*, Grasses
112	10/27	174	CED98111	03032402	*Vigna angularis*	〃	〃	〃	〃	32°59'02.6" N /132°57'36.5" E	ca. 0m	〃	〃	high	scattered 1ha but +-15 plants	mature	11 + bulk	yes	1	grassland next to rice field	*Solidago altissima*, Grasses
113	10/27	175	CED98112	03032440	*Vigna unguiculata*	cultivated	〃	Oogata 大方町	Kamitanokuti 上田ノ口	33°00'24.4" N /132°59'18.9" E	ca. 0m	Mountains				past maturity	bulk	no	0		
114	10/27	176	CED98113	03032403	*Vigna angularis*	wild	〃	〃	Hayasaki 早咲	33°02'01.5" N /133°01'00.6" E	ca. 0m	plain below mountain	open	high	50m^2	mature	bulk + 3	yes	3 (98113+114 together:1)		*Solidago altissima*
115	10/27	176	CED98114	02021482	*Glycine soja*	〃	〃	〃	〃	33°02'01.5" N /133°01'00.6" E	ca. 0m	plain	〃		5ha	〃	bulk	no	0		*Solidago altissima*
116	10/27	177	CED98115	03032483	〃	〃	〃	Nakatosa 中土佐町	Kure 久礼	33°20'24.4" N /133°13'09.3" E	ca. 0m	plain below mountain	〃		400m^2	〃	bulk	no	0	waste land	Cosmos
117	10/28	178	CED98116	03032404	*Vigna angularis*	〃	〃	Susaki 須崎市	Oonogoukou 多ノ郷甲	33°24'29.5" N /133°16'58.9" E	?	〃	〃	high	400m^2 scattered not dominant	pre-mature mature	13 + bulk	yes	4	waste land	*Glycine soja*
118	10/28	178	CED98117	03032484	*Glycine soja*	〃	〃	〃	〃	33°24'29.5" N /133°16'58.9" E	?	〃	〃	〃	1ha	pre-mature	10 + bulk	yes	2	waste land	*Solidago altissima*, *Miscanthus sinensis*
119	10/28	179	CED98118	03032405	*Vigna angularis*	〃	〃	Tosa 土佐市	Kitaji 北地	33°29'12.9" N /133°22'49.2" E	?	plain below hills	〃	〃	400m^2	mature	bulk	no	0	waste land, seed quality good	*Solidago altissima*. This is an abandoned persimmon orchard.
120	10/28	179	CED98119	03032485	*Glycine soja*	〃	〃	〃	〃	33°29'12.9" N /133°22'49.2" E	?	〃	〃	〃	800m^2	〃	bulk	no	0	mature seeds	

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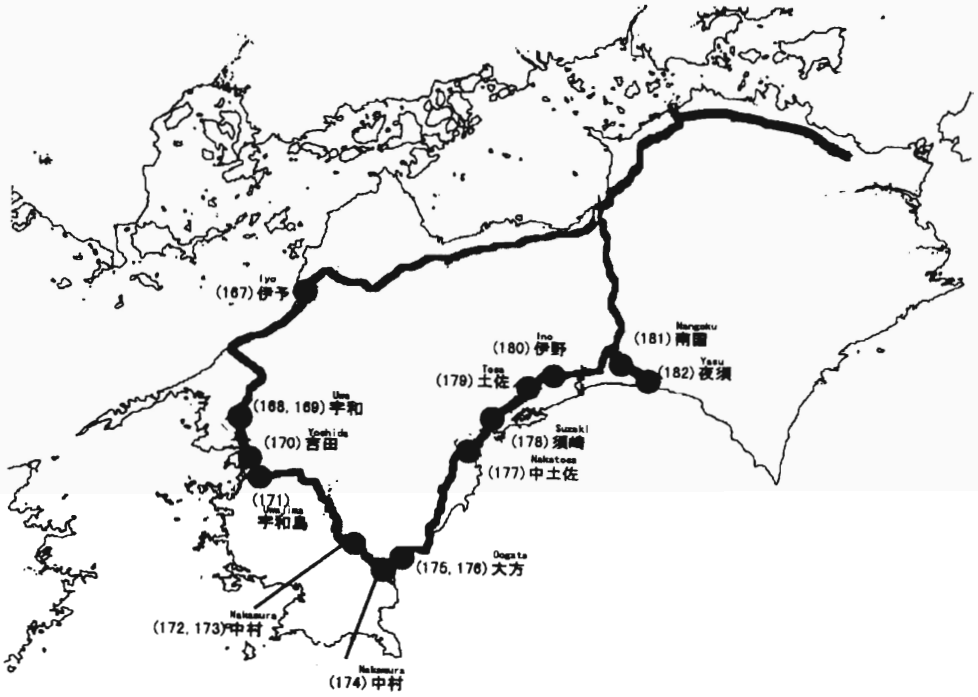
							Prefecture	District	Village												
121	10/28	180	CED98120	03032406	*Vigna angularis*	〃	〃	Ino 伊野町	Inomatiminami 伊野町南	33°30'34.1" N /133°26'31.4" E	ca. 0m	plain near by river	〃	〃	20×20=400m^2	〃	bulk	yes	3	waste land but near rice field. smooth pods + seeds	*Solidago altissima*
122	10/28	180	CED98121	03032486	*Glycine soja*	〃	〃	〃	〃	33°30'34.1" N /133°26'31.4" E	ca. 0m	〃	〃		over 1ha large		bulk	yes	1	seems in places badly diseased	*Solidago altissima*
123	10/28	180	CED98122	03032441	*Vigna unguiculata*	escaped	〃	〃	〃	33°30'34.1" N /133°26'31.4" E	ca. 0m	〃	〃		400m^2	mature	10 + bulk	yes	2	waste land	〃
124	10/28	181	CED98123	03032407	*Vigna angularis*	wild	〃	Nangoku 南国市	Mononobe 物部	33°33'43.4" N /133°40'48.5" E	ca. 0m	〃	〃				bulk	no	0	bushes	〃
125	10/28	181	CED98124	03032487	*Glycine soja*	〃	〃	〃	〃	33°33'43.4" N /133°40'48.5" E	ca. 0m	〃	〃		1ha+	mature	bulk	no	0	bushes	〃
126	10/28	182	CED98125	03032408	*Vigna angularis*	〃	〃	Yasu 夜須町	Kamiyasu 上夜須	33°32'48.4" N /133°46'17.6" E	ca. 0m	plain below hills	〃	med	scattered over 200m^2	〃	12 + bulk	yes	2	4-10 on edge for rice field・river levee about 20 plants	〃
127	10/28	182	CED98126	03032488	*Glycine soja*	〃	〃	〃	〃	33°32'48.4" N /133°46'17.6" E	ca. 0m	〃	〃	high	3ha dominant	pre-mature	bulk	yes	2	waste land	〃



Map. Exploration route and collection sites (●). Number in parenthesis indicate site number.
探索経路と収集地点(●)。カッコ内は収集地点番号。