

# Collection and Conservation of Wild Leguminous Crop Relatives on Oki Islands, Shimane, Japan, 2011

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## Summary

A field survey was conducted on Oki islands, Shimane prefecture, Japan, from 24<sup>th</sup> to 28<sup>th</sup> October, 2011. As a result, 79 accessions of leguminous plants consist of 1 accessions of *Amphicarpa bracteata*, 1 of *Glycine max*, 7 of *Glycine soja*, 70 of *Vigna angularis* (3 cultivated, 35 weedy, 32 wild) were recorded and seed samples were collected. All the seed materials collected were conserved at NIAS genebank, Japan. These accessions will be grown and evaluated in 2012 and will become available for research, breeding and educational purposes.

KEY WORDS : Oki islands, Shimane prefecture, wild legumes, *Glycine*, *Vigna*

## Introduction

Wild crop relatives are important genetic resources. In order to conserve genetic diversity of wild relatives of leguminous crops, the genebank of National Institute of Agrobiological Sciences, has been conducting domestic and overseas exploration (Tomooka *et al.* 2011). The previous exploration reports are available from the NIAS genebank web page.

<http://www.gene.affrc.go.jp/publications.php?section=plant>. (List of Annual Report on exploration, some are written in English)

[http://www.gene.affrc.go.jp/pdf/publications/plant-exp\\_2010\(27\)\\_p1.pdf](http://www.gene.affrc.go.jp/pdf/publications/plant-exp_2010(27)_p1.pdf) (a report of 2010 domestic exploration written in English as an example)

This is the first report of a field survey on wild relatives of leguminous crops on Oki islands, Shimane prefecture, Japan. Oki islands are located ca. 50km north of mainland Shimane prefecture.

## Methods

We surveyed Oki islands by car from 24<sup>th</sup> to 28<sup>th</sup> October, 2011 (Table 1, Fig. 1). Three islands, i.e., Dogojima, Nakanoshima and Nishinoshima, were surveyed. We used ferry boats to move between islands. Seeds, herbarium specimens and root nodules (if available) were

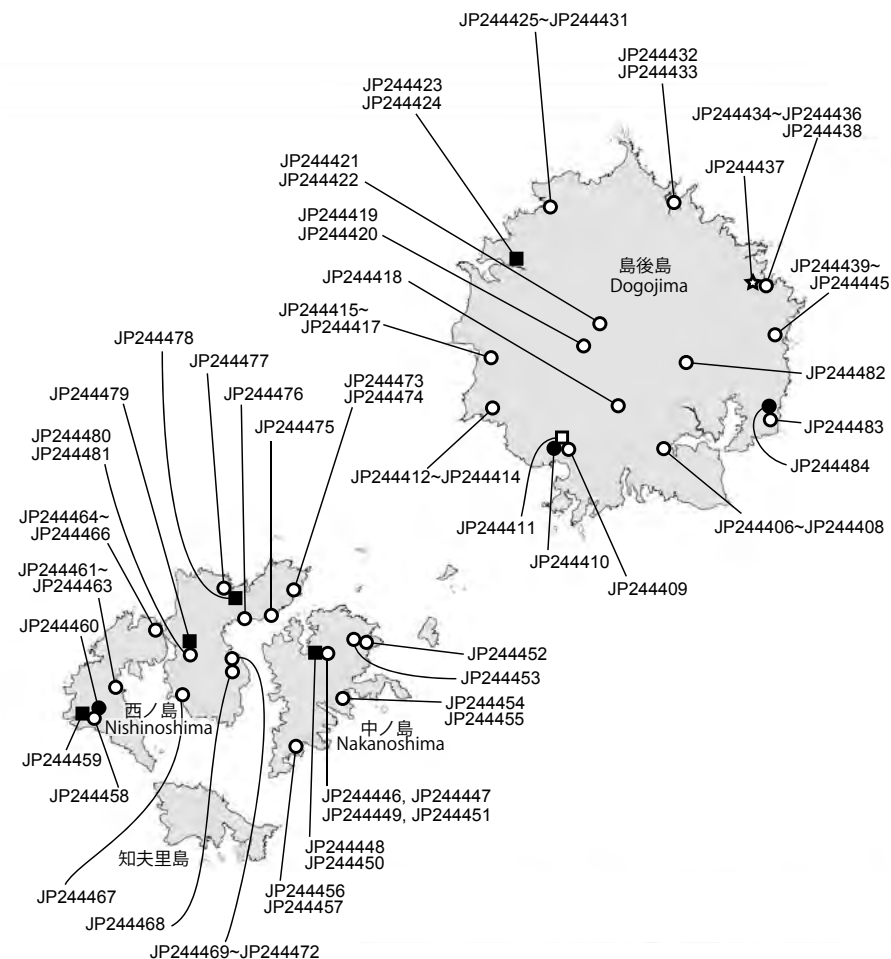


Fig. 1. A map of Oki islands, Shimane prefecture, Japan.

Collection sites are indicated by (○) for *Vigna angularis* var. *nipponensis*, (●) for *Vigna angularis* var. *angularis*, (□) for *Glycine max*, (■) for *Glycine soja* and (☆) for *Amphicarpa bracteata*. For each collection site, JP number of each accession is listed.

collected. Information on collection sites including village name, altitude, latitude, longitude, habitat sketch map and other ecological data were recorded on passport data sheets as summarized in Tables 2 and 3.

## Results and Discussion

A total of 79 accessions consist of 1 accessions of *Amphicarpa bracteata*, 1 of *Glycine max*, 7 of *Glycine soja*, 70 of *Vigna angularis* (3 cultivated, 35 weedy, 32 wild) were recorded and seed samples were collected (Table 2 & 3). Collected seed samples are conserved at NIAS genebank, Tsukuba, Japan and will be multiplied and evaluated in 2012. Multiplied seed samples will become available for research, breeding and educational purposes upon request. Searching ([http://www.gene.affrc.go.jp/databases-plant\\_search\\_en.php](http://www.gene.affrc.go.jp/databases-plant_search_en.php)) and requesting accessions ([http://www.gene.affrc.go.jp/distribution\\_en.php?section=plant](http://www.gene.affrc.go.jp/distribution_en.php?section=plant)) can be done through NIAS genebank web site.

Table 1. Itinerary of the field survey in Oki island. 日程表 (隠岐の島)

Date	Itinerary	Stay
2011/10/24	Tsukuba -- Haneda Airport 11:30 -- (JAL 115) -- 12:35 Osaka (Itami) Airport 14:10 -- (JAC2335) -- 15:05 Oki Airport (Dogojima Island)	Saigo, Dogojima Island
2011/10/25	Exploration on Dogojima Island (car)	Saigo, Dogojima Island
2011/10/26	Saigo Port (Dogojima Island) 8:20 -- (Ferry Boat) -- 9:30 Hishiura Port (Nakanoshima Island) -- Exploration on Nakanoshima Island (car) -- Hishiura Port (Nakanoshima Island) 14:00 -- (Ferry Boat) -- 14:15 Beppu Port (Nishinoshima Island) -- Exploration on Nishinoshima Island (car)	Beppu, Nishinoshima Island
2011/10/27	Exploration on Nishinoshima Island (car) -- Beppu Port (Nishinoshima Island) 12:20 -- (Ferry Boat) -- 14:00 Saigo Port (Dogojima Island) -- Exploration on Dogojima Island (car)	Saigo, Dogojima Island
2011/10/28	Oki Airport (Dogojima Island) 10:30 -- (JAC3434) -- 11:05 Izumo Airport 15:00 -- (JAL 1668) -- 17:40 Haneda Airport -- Tsukuba	

Table 2. A summary of collected materials

## 隠岐における収集品の内訳

Species	Cultivated	Weedy	Wild	Total
<i>Amphicarpa bracteata</i>			1	1
<i>G. max</i>	1			1
<i>G. soja</i>			7	7
<i>V. angularis</i> var. <i>angularis</i>	3			3
<i>V. angularis</i> var. <i>nipponensis</i>		35	32	67
Total	4	19	56	79

***Glycine soja* (Wild soybean, Tsuru-mame in Japanese)**

The NIAS genebank has been conducting comprehensive collecting survey of wild soybean throughout Japan, and genetic structure of wild soybean has been clarified (Kuroda *et al.*, 2006, 2008, 2009, 2010). However, this is the first survey by NIAS genebank for collecting wild soybean in Oki islands.

Wild soybean was not so common in Oki islands. Only 7 accessions were collected from 5 sites, 1 site on Dogojima, 1 site on Nakanoshima and 3 sites on Nishinoshima (Table 2, Fig. 1). Some of the habitats of wild soybean are shown (Photos 4, 7, 10 and 14). Among the collection sites of wild soybean, Oki-29 site at Mimiura beach (Photos 13 - 15), on Nishinoshima island is noteworthy because the habitat is very close to the sea shore. Therefore, it is expected that this accession (seed photo, JP244478) may have high level of salinity tolerance.

### ***Vigna angularis* (Wild, weedy and cultivated azuki bean)**

Weedy azuki bean was very common in Oki islands (Photos 5, 9, 11, 12, 14 and 16). Among 67 naturally growing (= Not planted by farmers) azuki bean populations found, 35 populations (52 %) were classified as weedy azuki bean based on their seed size, seed coat color and stem color (Table 2, seed photos). Wide phenotypic variations were observed for weedy populations in seed size and seed coat color. Among them, accessions collected at Oki-11-2 site (Photo 5, Kumi, Dogojima) seems to have hybrid swarm like variation, because they showed much larger seed size compared with typical wild azuki bean including red seeded accession (seed photos, JP244425 - JP244430).

At Oki-29 site (Mimiura beach, on Nishinoshima island, Photos 13 - 15), weedy azuki bean accession was also collected (JP244477) from a habitat close to the sea shore (Photo 14). This accession may have high level of salinity tolerance.

Three cultivated azuki bean accessions were collected from farmer's field (JP244410, JP244460 and JP244484). All were large seeded late maturity cultivars (seed photos).

### **References**

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# 島根県隠岐島におけるマメ科植物遺伝資源の探索収集, 2011年

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## 和文摘要

本報告は、島根県隠岐島におけるマメ科植物遺伝資源の調査報告である。調査は、2011年10月24日～10月28日にかけて行った。調査の結果、ヤブマメ1点、栽培ダイズ1点、野生ダイズであるツルマメ (*Glycine soja*) 7点、栽培アズキ3点、自生する雑草アズキ35点、野生アズキ32点、合計79点の遺伝資源を収集保存した。これらの遺伝資源は、2012年度につくば市の農業生物資源研究所において栽培し、特性評価、種子増殖を行い配布可能なアクティブコレクションとして生物研ジーンバンクにおいて保存する計画である。

Table 3. A passport data of collected materials

## 収集品のパスポートデータ

Coll. No.	JP No.	Coll. Date	Species name	Status	Locality	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
2011-OKI-1-1	244406	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Nishida, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-11-56.9	E133-18-03.1	10	clay	bulk	no	no	beside paddy, dark and pale black mottled seeds mixed.
2011-OKI-1-2	244407	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-11-56.3	E133-18-03.4	10	clay	bulk	no	no	beside small water way in a paddy area.
2011-OKI-1-3	244408	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-11-56.03	E133-18-09.12	9	clay	bulk	no	no	many plants growing in a fallow paddy field
2011-OKI-2	244409	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Sakodani, Tsuma, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-12-26.76	E133-13-43.60	32	clay	bulk	no	no	growing in a field after sorghum had been harvested
2011-OKI-3	244410	25 Oct. 2011	<i>Vigna angularis</i>	cultivated	"	N36-12-26.89	E133-13-42.70	30	clay	bulk	no	no	grown in a farmer's cultivated field
2011-OKI-4	244411	25 Oct. 2011	<i>Glycine max</i>	cultivated	"	N36-12-27.16	E133-13-43.55	33	clay	bulk	no	no	grown in a farmer's cultivated field
2011-OKI-5-1	244412	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	near Hamashin bridge, Nagu, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-12-59.98	E133-11-52.86	25	clay	bulk	no	no	between paddy and vegetable garden
2011-OKI-5-2	244413	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-13-00.67	E133-11-52.62	30	clay	bulk	no	no	beside paddy field
2011-OKI-5-3	244414	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-13-00.38	E133-11-51.63	27	clay	bulk	no	no	beside paddy field, a farmer said it is called "bundo", she does not eat it
2011-OKI-6-1	244415	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Yui, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-14-36.73	E133-11-45.64	18	clay	bulk	no	no	many plants growing in a fallow paddy field, looks like a cultivated field
2011-OKI-6-2	244416	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-14-36.14	E133-11-44.86	16	clay	bulk	no	no	many plants growing in a fallow paddy field, looks like a cultivated field
2011-OKI-6-3	244417	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-14-36.17	E133-11-45.93	21	clay	bulk	no	no	beside tea field
2011-OKI-7	244418	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Utagi, Tsuma, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-13-04.99	E133-16-17.74	83	clay	bulk	no	no	beside paddy field in a mountain valley, near a stream
2011-OKI-8 (BLACK SEEDS)	244419	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Okuirikudo, Kaminishi, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-14-40.7	E133-16-08.7	146	clay	bulk	no	no	road side just north of Kaminishi loop, wet habitat in mountainous place. black seeds samples separated from a mixed sample (2011-OKI -8)

Table 3 (Continued).

Coll. No.	JP No.	Coll. Date	Species name	Status	Locality	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
2011-OKI-8 (BROWN SEEDS)	244420	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Okuirikudo, Kaminishi, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-14-40.7	E133-16-08.7	146	clay	bulk	no	no	road side just north of Kaminishi loop, wet habitat in mountainous place. brown seeds samples separated from a mixed sample (2011-OKI -8)
2011-OKI-9-1	244421	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Kaminishi, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-14-59.14	E133-16-18.60	71	clay	bulk	no	no	many plants growing in an abandoned paddy field along R485, looks like a cultivated field
2011-OKI-9-2	244422	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-15-00.75	E133-16-17.06	75	clay	bulk	no	no	many plants growing in an abandoned paddy field along R485, looks like a cultivated field
2011-OKI-10-1	244423	25 Oct. 2011	<i>Glycine soja</i>	wild	(Goka) Kitagata, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-17-27.67	E133-13-21.43	1	clay	bulk	no	no	growing along a stream in a paddy area
2011-OKI-10-2	244424	25 Oct. 2011	<i>Glycine soja</i>	wild	"	N36-17-27.60	E133-13-18.04	1	clay	bulk	no	no	growing along a stream in a paddy area
2011-OKI-11-1	244425	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Kumi, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-19-10.01	E133-14-03.19	2	0	bulk	no	no	beside river. small brown seeds, hybrid swarm
2011-OKI-11-2 (RED SEEDS)	244426	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-19-10.17	E133-14-01.95	1	0	bulk	no	no	road side, in an abandoned paddy, hybrid swarm. red seeds samples separated from a mixed sample (2011-OKI -11-2)
2011-OKI-11-2 (BLACK MOTTLED RED SEEDS)	244427	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-19-10.17	E133-14-01.95	1	0	bulk	no	no	road side, in an abandoned paddy, hybrid swarm. black mottled red seeds samples separated from a mixed sample (2011-OKI -11-2)
2011-OKI-11-2 (PALE BROWN SEEDS)	244428	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-19-10.17	E133-14-01.95	1	0	bulk	no	no	road side, in an abandoned paddy, hybrid swarm. pale brown seeds samples separated from a mixed sample (2011-OKI -11-2)
2011-OKI-11-2 (LARGE BLACK MOTTLED BROWN SEEDS)	244429	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-19-10.17	E133-14-01.95	1	0	bulk	no	no	road side, in an abandoned paddy, hybrid swarm. large black mottled seeds samples separated from a mixed sample (2011-OKI -11-2)
2011-OKI-11-2 (SMALL BLACK MOTTLED BROWN SEEDS)	244430	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-19-10.17	E133-14-01.95	1	0	bulk	no	no	road side, in an abandoned paddy, hybrid swarm. small black mottled seeds samples separated from a mixed sample (2011-OKI -11-2)
2011-OKI-11-3	244431	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-19-10.25	E133-14-01.53	1	0	bulk	no	no	along a river, near Kiyomi bridge
2011-OKI-12-1	244432	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Nakamura, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-19-04.77	E133-18-37.00	2	clay	bulk	no	no	beside paddy

Table 3 (Continued).

Coll. No.	JP No.	Coll. Date	Species name	Status	Locality	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
2011-OKI-12-2	244433	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Nakamura, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-19-04.90	E133-18-37.7	3	clay	bulk	no	no	beside paddy
2011-OKI-13-1	244434	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Uzuki, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-16-36.66	E133-21-46.93	2	clay	bulk	no	no	beside paddy
2011-OKI-13-2	244435	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-16-38.32	E133-21-47.84	2	clay	bulk	no	no	beside Uzuki river
2011-OKI-13-3	244436	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-16-36.61	E133-21-45.56	3	clay	bulk	no	no	beside paddy
2011-OKI-13-4	244437	25 Oct. 2011	<i>Amphicarpa bracteata</i>	wild	"	N36-16-36.58	E133-21-45.72	3	clay	bulk	no	no	beside paddy
2011-OKI-13-5	244438	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-16-36.52	E133-21-46.67	3	clay	bulk	no	no	beside paddy
2011-OKI-14-1 (DENSELY BLACK MOTTLED BROWN SEEDS)	244439	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Ooku, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-15-00.18	E133-22-08.79	3	clay	bulk	no	no	beside paddy. black seeds samples separated from a mixed sample (2011-OKI -14-1)
2011-OKI-14-1 (BLACK MOTTLED BROWN SEEDS)	244440	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-15-00.18	E133-22-08.79	3	clay	bulk	no	no	beside paddy. brown seeds samples separated from a mixed sample (2011-OKI -14-1)
2011-OKI-14-2	244441	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-14-59.43	E133-22-08.81	5	clay	bulk	no	no	beside paddy
2011-OKI-14-3 (DENSELY BLACK MOTTLED BROWN SEEDS)	244442	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-15-00.36	E133-22-10.05	3	clay	bulk	no	no	black mottled seeds samples separated from a mixed sample (2011-OKI -14-3)
2011-OKI-14-3 (BLACK MOTTLED BROWN SEEDS)	244443	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-15-00.36	E133-22-10.05	3	clay	bulk	no	no	brown pod. beside paddy. brown mottled seeds samples separated from a mixed sample (2011-OKI -14-3)
2011-OKI-14-3 (PALE BROWN SEEDS)	244444	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-15-00.36	E133-22-10.05	3	clay	bulk	no	no	brown pod. beside paddy. pale brown seeds samples separated from a mixed sample (2011-OKI -14-3)
2011-OKI-14-4	244445	25 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-15-00.60	E133-22-09.17	3	clay	bulk	no	no	beside paddy



Table 3 (Continued).

Coll. No.	JP No.	Coll. Date	Species name	Status	Locality	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
2011-OKI-15-1 (BLACK MOTTLED BROWN SEEDS)	244446	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Nakazato, Ama-cho, Oki-gun, Shimane (Nakanoshima)	N36-06-01.57	E133-05-59.19	11	clay	bulk	no	no	beside paddy along a cannal. black seeds samples separated from a mixed sample (2011-OKI -15-1)
2011-OKI-15-1 (PALE BROWN SEEDS)	244447	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-06-01.57	E133-05-59.19	11	clay	bulk	no	no	beside paddy along a cannal. brown seeds samples separated from a mixed sample (2011-OKI -15-1)
2011-OKI-15-2	244448	26 Oct. 2011	<i>Glycine soja</i>	wild	"	N36-06-01.12	E133-05-59.05	10	clay	bulk	no	no	beside paddy along a cannal
2011-OKI-15-3	244449	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-06-00.94	E133-05-58.96	9	clay	bulk	no	no	brown seeds, beside paddy along a cannal
2011-OKI-15-4	244450	26 Oct. 2011	<i>Glycine soja</i>	wild	"	N36-05-57.58	E133-05-57.70	6	clay	bulk	no	no	beside paddy along a cannal
2011-OKI-15-5	244451	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-06-01.42	E133-05-56.84	11	clay	bulk	no	no	beside paddy along a cannal
2011-OKI-16	244452	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Toyoda, Ama-cho, Oki-gun, Shimane (Nakanoshima)	N36-06-17.38	E133-07-34.85	5	clay	bulk	no	no	growing abundantly on a slope beside paddy, eat as boiled bean mixed with azuki bean formerly
2011-OKI-17	244453	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Toyoda, Ama-cho, Oki-gun, Shimane (Nakanoshima)	N36-06-21.1	E133-07-25.8	28	clay	bulk	no	no	road side slope
2011-OKI-18-1	244454	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Chichii, Ama-cho, Oki-gun, Shimane (Nakanoshima)	N36-04-40.45	E133-06-28.37	54	clay	bulk	no	no	road side, black seeds
2011-OKI-18-2	244455	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-04-40.53	E133-06-28.03	56	clay	bulk	no	no	road side, brown seeds
2011-OKI-19 (DENSELY BLACK MOTTLED BROWN SEEDS)	244456	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Saki, Ama-cho, Oki-gun, Shimane (Nakanoshima)	N36-02-50.3	E133-04-57.5	22	clay	bulk	no	no	road side. black seeds samples separated from a mixed sample (2011-OKI -19)
2011-OKI-19 (BLACK MOTTLED BROWN SEEDS)	244457	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-02-50.3	E133-04-57.5	22	clay	bulk	no	no	road side. brown seeds samples separated from a mixed sample (2011-OKI -19)
2011-OKI-20-1	244458	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Mitabe, Urago, Nishinoshima- cho, Oki-gun, Shimane (Nishinoshima)	N36-04-00.09	E132-57-33.54	23	clay	bulk	no	no	abandoned field near abolished school
2011-OKI-20-2	244459	26 Oct. 2011	<i>Glycine soja</i>	wild	"	N36-03-59.92	E132-57-33.31	22	clay	bulk	no	no	abandoned field near abolished school

Table 3 (Continued).

Coll. No.	JP No.	Coll. Date	Species name	Status	Locality	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
2011-OKI-20-3	244460	26 Oct. 2011	<i>Vigna angularis</i>	cultivated	"	N36-04-00.41	E132-57-34.20	24	clay	bulk	no	no	cultivated field near abolished school
2011-OKI-21-1 (DENSELY BLACK MOTTLED BROWN SEEDS)	244461	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Shakunoe, Urago, Nishinoshima-cho, Oki-gun, Shimane	N36-04-42.2	E132-58-42.1	19	clay	bulk	no	no	beside abandoned house. black mottled seeds samples separated from a mixed sample (2011-OKI -21-1). dark black mottled seeds, pale black mottled seeds, mixed
2011-OKI-21-1 (BLACK MOTTLED BROWN SEEDS)	244462	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-04-42.2	E132-58-42.1	19	clay	bulk	no	no	beside abandoned house. brown seeds samples separated from a mixed sample (2011-OKI -21-1)
2011-OKI-21-2	244463	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-04-42.41	E132-58-42.53	16	clay	bulk	no	no	road side near abandoned house. dark black mottled seeds, pale black mottled seeds, mixed.
2011-OKI-22-1	244464	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Funakoshi, Mita, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-06-30.0	E133-00-09.7	15	gravel	bulk	no	no	abandoned field
2011-OKI-22-2	244465	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-06-30.23	E133-00-08.74	14	clay	bulk	no	no	abandoned field. dark black mottled seeds, pale black mottled seeds, mixed
2011-OKI-22-3	244466	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-06-29.62	E133-00-07.85	16	clay	bulk	no	no	abandoned field. dark black mottled seeds, pale black mottled seeds, mixed
2011-OKI-23	244467	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Hashi, Mita, Nishinoshima- cho, Oki-gun, Shimane (Nishinoshima)	N36-04-30.97	E133-00-47.08	3	sand	bulk	no	no	road side grassland near resort hotel, late maturity growing, like a cultivated field
2011-OKI-24	244468	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	beside Ooyama water purification plant, Ooyama, Mita, Nishinoshima- cho, Oki-gun, Shimane (Nishinoshima)	N36-05-27.2	E133-02-43.3	21	gravel	bulk	no	no	road side
2011-OKI-25-1	244469	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Ooyama, Mita, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-05-40.1	E133-02-42.2	3	gravel	bulk	no	no	road side, black seeds
2011-OKI-25-2	244470	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-05-40.11	E133-02-42.31	3	gravel	bulk	no	no	road side, brown seeds
2011-OKI-25-3 (DENSELY BLACK MOTTLED BROWN SEEDS)	244471	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	"	N36-05-40.09	E133-02-41.73	3	gravel	bulk	no	no	road side. black seeds samples separated from a mixed sample (2011-OKI -25-3)
2011-OKI-25-3 (BLACK MOTTLED BROWN SEEDS)	244472	26 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-05-40.09	E133-02-41.73	3	gravel	bulk	no	no	road side. brown seeds samples separated from a mixed sample (2011-OKI -25-3)
2011-OKI-26-1	244473	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Uka, Nishinoshima- cho, Oki-gun, Shimane (Nishinoshima)	N36-07-22.79	E133-04-37.44	47	highly organic	bulk	no	no	in a cultivated field, brown seeds

Table 3 (Continued).

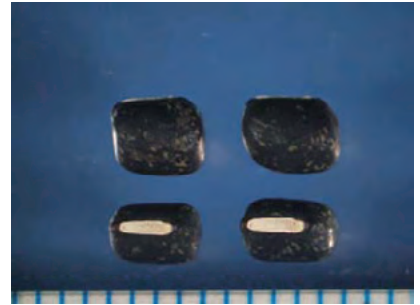
Coll. No.	JP No.	Coll. Date	Species name	Status	Locality	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
2011-OKI-26-2	244474	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Mitabe, Urago, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-07-21.89	E133-04-37.73	46	gravel	bulk	no	no	beside ditch
2011-OKI-27	244475	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Kuranotani, Uka, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-06-50.4	E133-04-07.8	2	gravel	bulk	no	no	beside road near the seashore
2011-OKI-28	244476	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Monoi, Uka, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-06-47.5	E133-03-04.5	2	highly organic	bulk	no	no	beside home garden, green stem
2011-OKI-29-1	244477	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	beside "Mimiura camp", Mimiura, Uka, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-07-38.3	E133-02-41.38	3	sand	bulk	no	no	growing near seashore
2011-OKI-29-2	244478	27 Oct. 2011	<i>Glycine soja</i>	wild	beside "Mimiura camp", Mimiura, Uka, Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-07-37.57	E133-02-45.33	3	sand	bulk	no	no	growing near seashore
2011-OKI-30-1	244479	27 Oct. 2011	<i>Glycine soja</i>	wild	Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-06-07.79	E133-01-10.89	15	clay	bulk	no	no	beside fallow field
2011-OKI-30-2 (DENSELY BLACK MOTTLED BROWN SEEDS)	244480	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	Nishinoshima-cho, Oki-gun, Shimane (Nishinoshima)	N36-06-07.22	E133-01-11.57	15	clay	bulk	no	no	in a fallow field. black mottled seeds samples separated from a mixed sample (2011-OKI -30-2). dark black mottled seeds, pale black mottled seeds, mixed.
2011-OKI-30-2 (BLACK MOTTLED BROWN SEEDS)	244481	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	weedy	"	N36-06-07.22	E133-01-11.57	15	clay	bulk	no	no	in a fallow field. brown seeds samples separated from a mixed sample (2011-OKI -30-2)
2011-OKI-31	244482	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	South of "Choshi-dam", Harada, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-14-22.75	E133-18-10.51	35	silt	bulk	no	no	beside road, local name: zard
2011-OKI-32-1	244483	27 Oct. 2011	<i>Vigna angularis</i> var. <i>nipponensis</i>	wild	Inugu, Okinoshima-cho, Oki-gun, Shimane (Dogojima)	N36-13-01.41	E133-22-09.12	24	silt	bulk	no	no	in an abandoned field
2011-OKI-32-2	244484	27 Oct. 2011	<i>Vigna angularis</i>	cultivated	"	N36-13-01.54	E133-22-09.18	24	silt	bulk	no	no	in a cultivated field



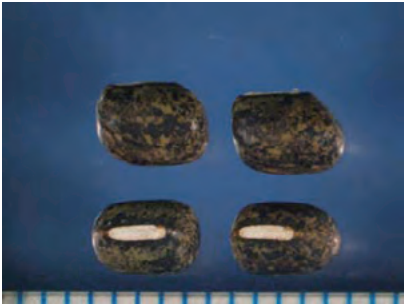
JP244406, Oki-01-1



JP244407, Oki-01-2



JP244408, Oki-01-3



JP244409, Oki-02



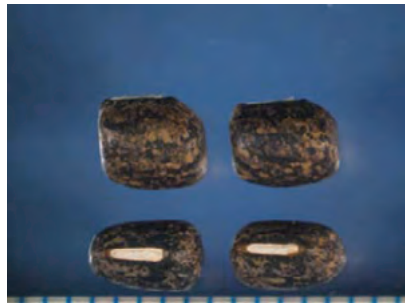
JP244410, Oki-03



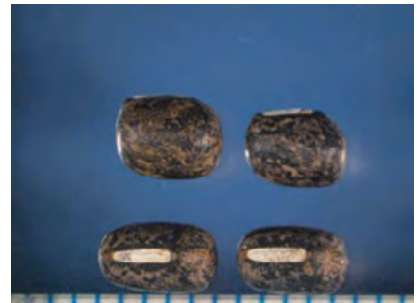
JP244411, Oki-04



JP244412, Oki-05-1



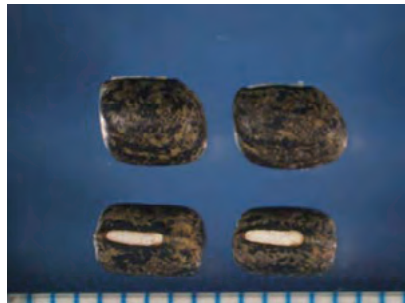
JP244413, Oki-05-2



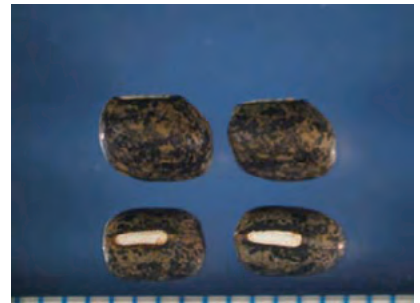
JP244414, Oki-05-3



JP244415, Oki-06-1



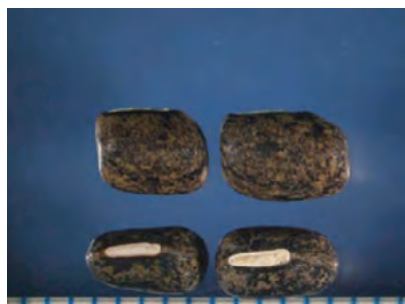
JP244416, Oki-06-2



JP244417, Oki-06-3



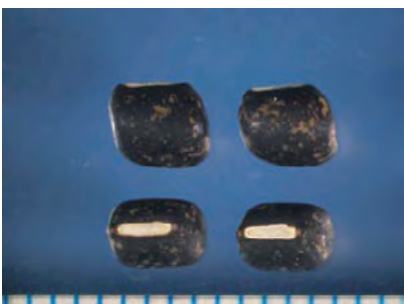
JP244418, Oki-07



JP244419, Oki-08 (Black)



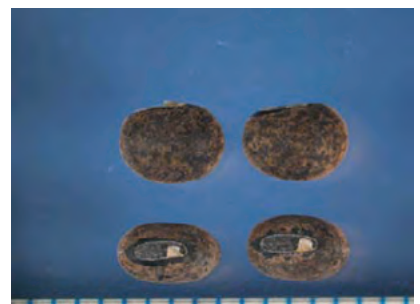
JP244420, Oki-08 (Brown)



JP244421, Oki-09-1



JP244422, Oki-09-2



JP244423, Oki-10-1

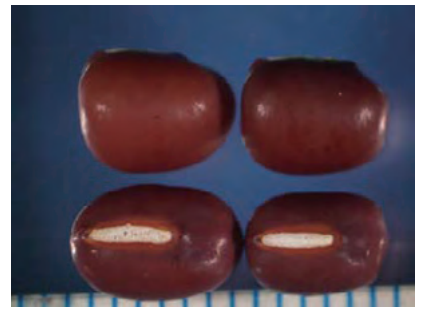




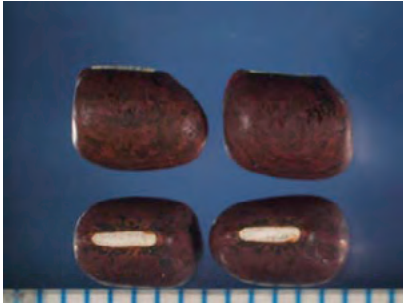
JP244424, Oki-10-2



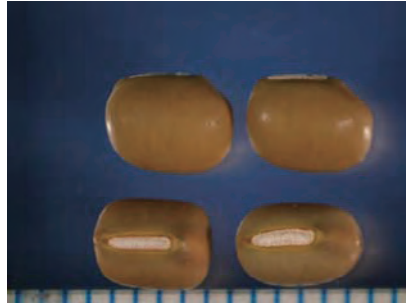
JP244425, Oki-11-1



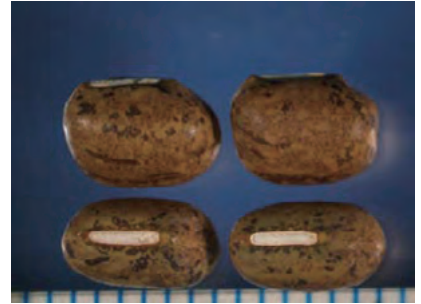
JP244426, Oki-11-2 (Red)



JP244427, Oki-11-2 (Black Mottled Red)



JP244428, Oki-11-2 (Pale Brown)



JP244429, Oki-11-2 (Large Black Mottled Brown)



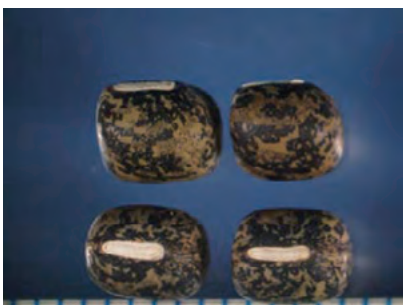
JP244430, Oki-11-2 (Small Black Mottled Brown)



JP244431, Oki-11-3



JP244432, Oki-12-1



JP244433, Oki-12-2



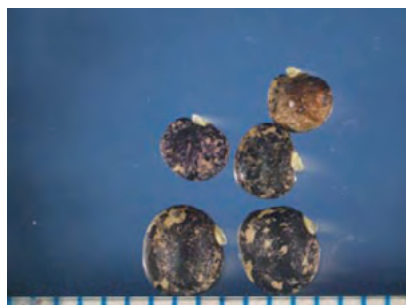
JP244434, Oki-13-1



JP244435, Oki-13-2



JP244436, Oki-13-3



JP244437, Oki-13-4



JP244438, Oki-13-5



JP244439, Oki-14-1 (Densely Black Mottled Brown)

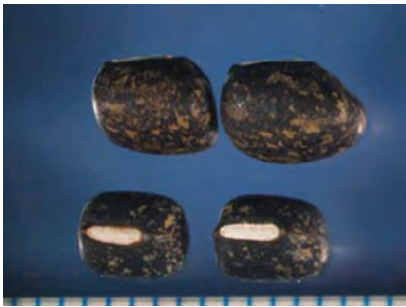


JP244440, Oki-14-1 (Black Mottled Brown)

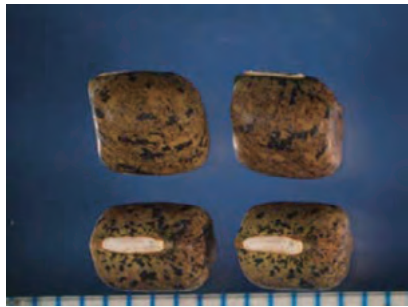


JP244441, Oki-14-2





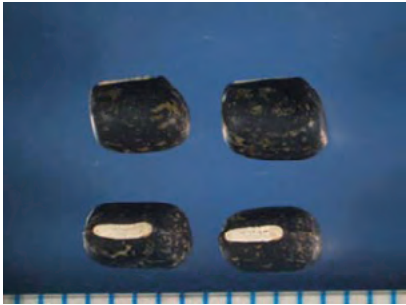
JP244442, Oki-14-3 (Densely Black Mottled Brown)



JP244443, Oki-14-3 (Black Mottled Brown)



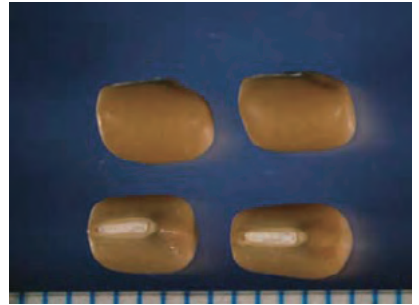
JP244444, Oki-14-3 (Pale Brown)



JP244445, Oki-14-4



JP244446, Oki-15-1 (Black Mottled Brown)



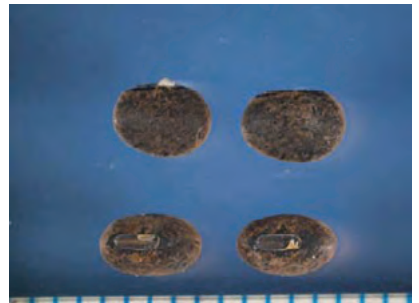
JP244447, Oki-15-1 (Pale Brown)



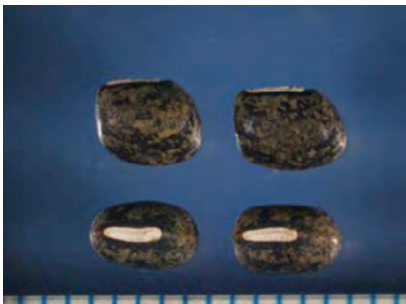
JP244448, Oki-15-2



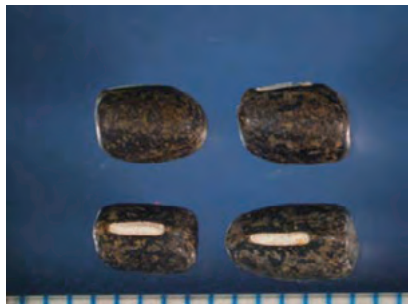
JP244449, Oki-15-3



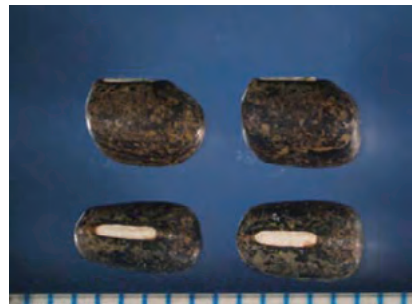
JP244450, Oki-15-4



JP244451, Oki-15-5



JP244452, Oki-16



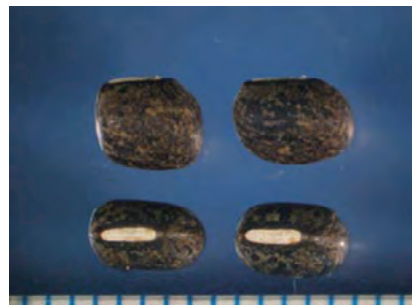
JP244453, Oki-17



JP244454, Oki-18-1



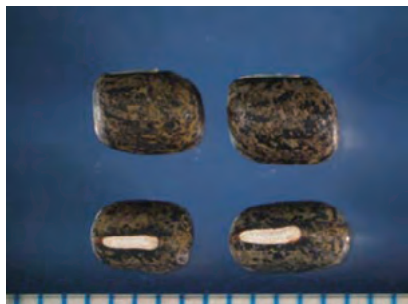
JP244455, Oki-18-2



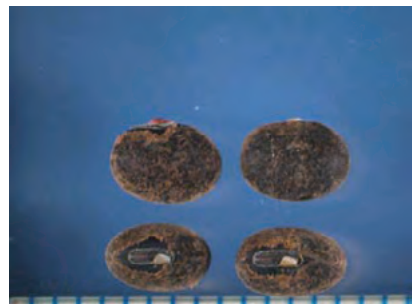
JP244456, Oki-19 (Densely Black Mottled Brown)



JP244457, Oki-19 (Black Mottled Brown)



JP244458, Oki-20-1



JP244459, Oki-20-2





JP244460, Oki-20-3



JP244461, Oki-21-1 (Densely Black Mottled Brown)



JP244462, Oki-21-1 (Black Mottled Brown)



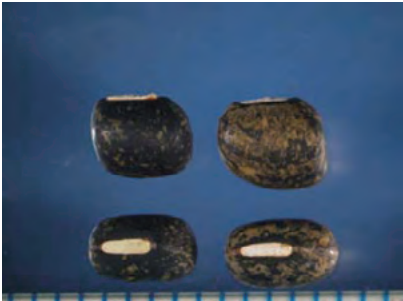
JP244463, Oki-21-2



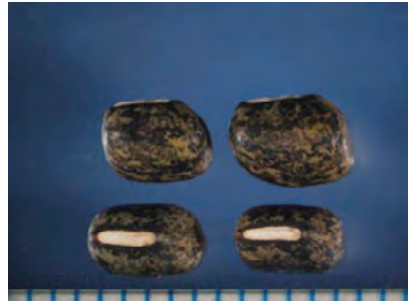
JP244464, Oki-22-1



JP244465, Oki-22-2



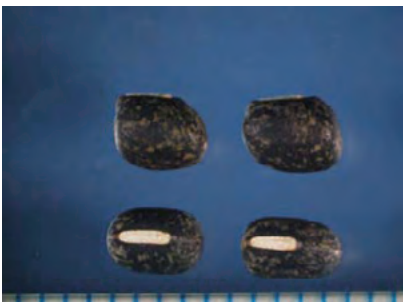
JP244466, Oki-22-3



JP244467, Oki-23



JP244468, Oki-24



JP244469, Oki-25-1



JP244470, Oki-25-2



JP244471, Oki-25-3 (Densely Black Mottled Brown)



JP244472, Oki-25-3 (Black Mottled Brown)



JP244473, Oki-26-1



JP244474, Oki-26-2



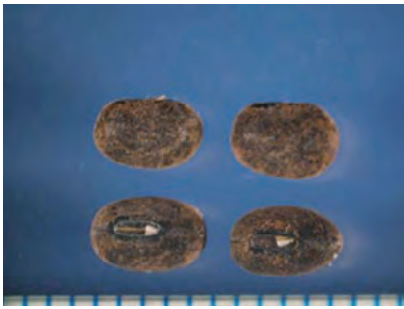
JP244475, Oki-27



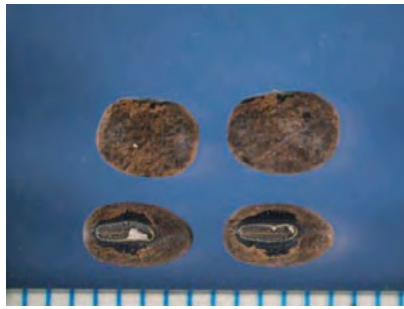
JP244476, Oki-28



JP244477, Oki-29-1



JP244478, Oki-29-2



JP244479, Oki-30-1



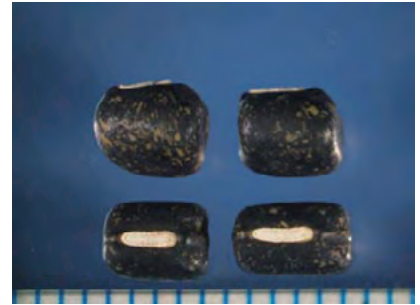
JP244480, Oki-30-2 (Densely Black Mottled Brown)



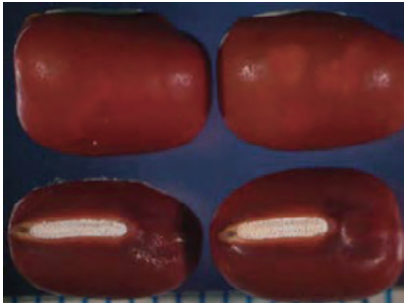
JP244481, Oki-30-2 (Black Mottled Brown)



JP244482, Oki-31



JP244483, Oki-32-1



JP244484, Oki-32-2





Photo 1. A large wild azuki population (Oki-6, JP244415) growing in a fallow paddy field beside road near Yui, Dogojima (油井, 島後島).



Photo 2. Leaf and flower of wild azuki bean (Oki-7, JP244418) growing beside paddy field at Utagi, Dogojima (歌木, 島後島)



Photo 3. A large wild azuki population (Oki-9, JP244421) growing in a fallow paddy field beside road near Kaminishi, Dogojima (上西, 島後島)



Photo 4. A wild soybean population (Oki-10, JP244423) found along irrigation stream in a wide paddy area at Goka, Dogojima (五箇, 島後島)



Photo 5. A weedy hybrid swarm population (Oki-11, JP244426-JP244429) found in an abandoned paddy field near Kumi, Dogojima (久見, 島後島)



Photo 6. A wild azuki bean population (Oki-12, JP244432) found beside harvested paddy in Nakamura, Dogojima (中村, 島後島)



Photo 7. Wild azuki and wild soybean found sympatrically (Oki-15, JP244446-JP244451) at road side in a paddy area, Nakanoshima (Nakazato, 中里, 中ノ島)



Photo 8. A large population of wild azuki bean (Oki-16, JP244452) growing at slope beside paddy field in Toyoda, Nakanoshima (豊田, 中ノ島)





Photo 9. Wild and weedy azuki bean (Oki-18, JP244454-JP244455) found in road side grassland near Chichii, Nakanoshima (知々井, 中ノ島)



Photo 10. Wild azuki and wild soybean growing sympatrically (Oki-20, JP244458, JP244459) in a grassland near abandoned school at Mitabe, Nishinoshima (三度, 西ノ島)



Photo 11. Weedy azuki population (Oki-23, JP244467) found in a grassland near resort hotel at Hashi, Nishinoshima (波止, 西ノ島) showed very late maturity growth habit.



Photo 12. At this site (Oki-23), weedy azuki bean plants were growing abundantly like a cultivated field.



Photo 13. Mimiura stony beach (耳浦) was located on the northern side of Nishinoshima (西ノ島)



Photo 14. At this Mimiura beach site (Oki-29), weedy azuki (JP244477) were found growing in a grassland habitat near seashore.



Photo 15. At this Mimiura site, wild soybean (JP244478) were also found in a grassland habitat located opposite side from wild azuki bean site near seashore.



Photo 16. A weedy azuki bean populations (Oki-30) were found in a wide paddy area east of Ichibu, Nishinoshima (市部, 西ノ島). They were also growing in an irrigation canal.