

Collection and Conservation of Wild Leguminous Crop Relatives on Ishigaki-jima, Iriomote-jima and Kuro-shima Islands, Okinawa, Japan, 2011

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Summary

A field survey was conducted on Ishigaki-jima, Iriomote-jima and Kuro-shima islands, Okinawa prefecture, Japan, from 28th June to 2nd July, 2011. As a result, 27 accessions of leguminous plants consist of 1 accession of *Glycine koidzumii*, 1 of *Lotus* sp., 1 of *Vigna luteola*, 10 of *Vigna marina*, 1 of *Vigna reflexo-pilosa* and 13 of *Vigna riukiensis* were recorded and seed samples were collected if available. 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 : wild legumes, *Glycine*, *Vigna*

Introduction

Recently, crop wild relatives are becoming highly important genetic resources. In order to conserve genetic diversity of wild relatives of leguminous crops, the genebank of National Institute of Agrobiological Sciences (NIAS genebank), has been conducting domestic and overseas exploration (Vaughan *et al.*, 2010[A1] http://www.gene.affrc.go.jp/pdf/misc/international-WS_14_1.pdf, Tomooka *et al.*, 2011). The previous exploration reports are available from the NIAS genebank web page indicated below.

<http://www.gene.affrc.go.jp/publications.php?section=plant>. (some articles are written in English)

In 2004, we conducted an exploration for crop wild relatives in Ishigaki-jima island (Tomooka *et al.*, 2005, http://www.gene.affrc.go.jp/plant/pdf/report/parts/2004_1-10.pdf). In the present exploration, some of the habitats found in 2004 were re-visited and re-surveyed. In addition to Ishigaki-jima island, we have surveyed Iriomote-jima and Kuro-shima islands, Okinawa prefecture, Japan.

Table 1. Itinerary of the exploration in Okinawa prefecture, Japan (2011)

Date	Day	Itinerary	Stay
2011/6/28	Tue.	Tsukuba -- Haneda 07:45 -- (ANA125) -- 10:20 Naha --(ANA1765) -- 10:50 Ishigaki -- Exploration in Ishigaki-jima island (car)	Ishigaki
2011/6/29	Wed.	Exploration in Ishigaki-jima island (car)	Ishigaki
2011/6/30	Thu.	Ishigaki 8:00 -- (boat) -- 8:35 Ohara, Iriomote -- Exploration in Iriomote-jima island (car) -- Uehara, Iriomote 17:00 -- (boat) -- 17:40 Ishigaki	Ishigaki
2011/7/1	Fri.	Ishigaki 8:00 -- (boat) -- 8:25 Kuro-shima island -- Exploration in Kuro-shima island (car) - Kuro-shima island 17:10 -- (boat) -- 17:40 Ishigaki	Ishigaki
2011/7/2	Sat.	Ishigaki 11:25 -- (ANA1766) -- 12:15 Naha 12:45 -- (ANA126) -- 15:10 Haneda -- Tsukuba	

Methods

We surveyed three islands by car from 28th June to 2nd July, 2011 (Table 1, Fig. 1). We stayed at Ishigaki-jima island and used speed boat to move between islands. Seeds, herbarium specimens and root nodules (if available) were 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 27 accessions consist of 1 accession of *Glycine koidzumii*, 1 of *Lotus* sp., 1 of *Vigna luteola*, 10 of *Vigna marina*, 1 of *Vigna reflexo-pilosa* and 13 of *Vigna riukiensis* were recorded and seed samples were collected (Table 2). 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) and requesting accessions (http://www.gene.affrc.go.jp/distribution_en.php?section=plant) can be done through NIAS genebank web site.

Table 2. A summary of collected samples

Species	Cultivated	Weedy	Wild	Total
<i>Vigna luteola</i>	0	0	1	1
<i>Vigna mairna</i>	0	0	10	10
<i>Vigna reflexo-pilosa</i>	0	0	1	1
<i>Vigna riukiensis</i>	0	0	13	13
<i>Lotus</i> sp.	0	0	1	1
<i>Glycine koidzumii</i>	0	0	1	1
Total	0	0	27	27

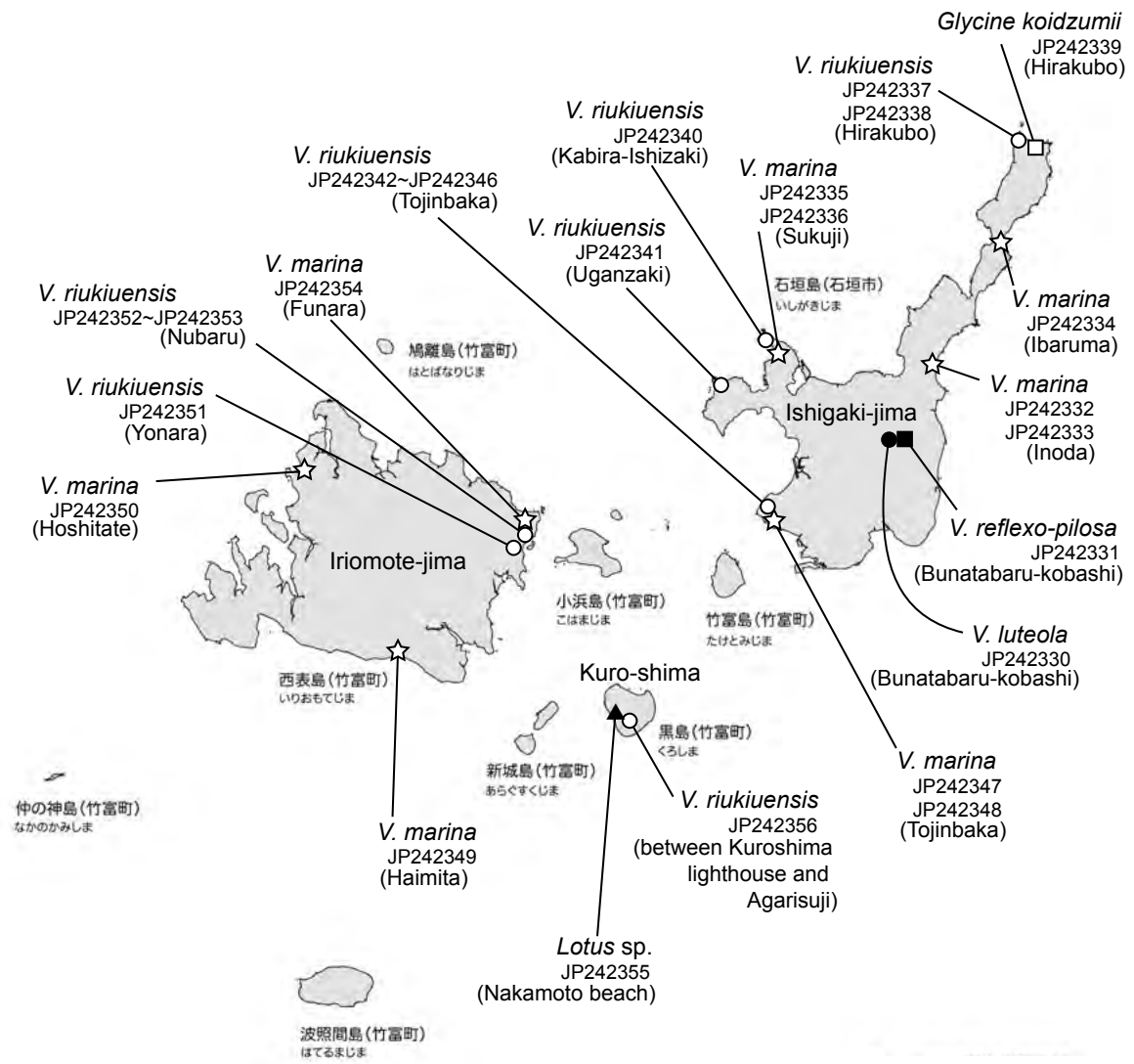


Fig. 1. A map of Ishigaki-jima, Iriomote-jima and Kuro-shima islands, Okinawa prefecture, Japan.

Collection sites are indicated by (○) for *Vigna riukuensis*, (●) for *Vigna luteola*, (■) for *Vigna reflexo-pilosa*, (☆) for *Vigna marina*. For each collection site, species name and JP number of each accession is listed. Place name is indicated in a parenthesis.

Glycine koidzumii (Wild perennial soybean, Miyako-jima tsuru-mame in Japanese)

An accession of *Glycine koidzumii* was collected at northernmost site (around Hirakubo lighthouse) of Ishigaki-jima island (Fig. 1).

Taxonomic treatment of *Glycine* plants distributed in Okinawa archipelago (Japan) and Taiwan (China) is confusing. Phylogenetical analysis of these confusing taxa including *Glycine tabacina*, *G. koidzumii*, *G. cladestina*, *G. tomentella* and *G. dolichocarpa* is necessary (Tateishi and Ohashi, 1992, Tateishi, 1995). The material collected in the present survey could be used for that study.

***Vigna marina* (Beach cowpea)**

Vigna marina is a pan tropical species distributed on sandy beach (Tomooka *et al.*, 2010). Ten accessions of *V. marina* were collected (Table 2). Among them, 7 accessions were collected in Ishigaki-jima island and 3 were from Iriomote-jima island (Fig. 1).

At Inoda (Photo 3) and Ibaruma beaches (Ishigaki-jima island), most of the pods (seeds) were damaged by larvae of butterfly. At Inoda site, there was a population consists of several plants which showed very few pod damage by butterfly (JP242333, 2011-Ishi-3-1). These plants were growing on sandy beach near a stream and formed large nodules on their roots. Population size was smaller in Ibaruma site compared with that in Inoda site.

At Sukuji beach (Ishigaki-jima island), many *V. marina* plants had been buried under sands possibly by heavy wind and sea waves (Photo 4). Some plants were parasitized by *Cassytha filiformis* L., which sometimes totally killed *V. marina* plants (Photo 5). At sandy beach, *V. marina* plants can produce roots directly from their crawling stems (Photo 6).

A large population of *V. marina* was found along a long sandy beach of Haimita, Iriomote-jima island (Photo 11). Compared with Inoda and Ibaruma beach (Ishigaki-jima island), percentage of damaged pods eaten by the larvae of butterfly in this beach were less. Another population of *V. marina* was found at Hoshitate beach (Iriomote-jima island). Plants of *V. marina* were growing on sandy beach and also on the stone wall constructed on sandy beach (Photo 12). *V. marina* plants were parasitized by *Cassytha filiformis* at this site. A large population of *V. marina* was found growing on stone wall between beach and road near Funara bridge, Iriomote-jima island (Photo 14). Exceptionally high percentage of pod set was observed in this place (Photo 15).

Vigna luteola

Vigna luteola is a pan tropical species which is used as a fodder crop in Australia and USA (Tomooka *et al.*, 2010). One population of *V. luteola* was found in Ishigaki-jima island (Fig. 1). *V. luteola* plants were growing along both side of a river near Bunatabaru-kobashi bridge (Photo 1). Root nodules were also collected at this site (Photo 2). Some plants were growing near the river and will be submerged under the water at the time of heavy rain.

Vigna reflexo-pilosa

V. reflexo-pilosa is an only one tetraploid ($2n=44$) species in the genus *Vigna* (Tomooka *et al.*, 2002). There is a domesticated taxa (*V. reflexo-pilosa* var. *glabra*). A population of *V. reflexo-pilosa* was found at the same site of *V. luteola* near Bunatabaru-kobashi bridge (Photo 1). Not like *V. luteola*, *V. reflexo-pilosa* plants were found only on the west side of the river bank.

Vigna riukiensis

Vigna riukiensis is a wild relative which is cross compatible with both azuki bean (*V. angularis*) and rice bean (*V. umbellata*) (Tomooka *et al.*, 2002). Thirteen accessions of *V. riukiensis* were collected, 9 from Ishigaki-jima island, 3 from Iriomote-jima island and 1 from Kuro-shima island (Table 2, Fig. 1). Near Hirakubo lighthouse, the northernmost place of Ishigaki-jima island, 2 accessions of *V. riukiensis* were collected. One was collected on the

slope of small hill (Photo 7), and the other was collected on the top of small hill where strong winds were prevailing (Photo 8). Thick and shiny small rounded leaflets are one of the specific characters of *V. riukiensis* (Photo 9).

References

- Tateishi Y and Ohashi H. 1992. Taxonomic studies on *Glycine* of Taiwan. J. Jpn. Bot. 67: 127-147.
- Tateishi Y. 1995. Re-consideration of leguminous flora in Ryukyu islands - *Glycine tabacina* and *G. koidzumii*. Acta Phytotax. Geobot. 46. 216-218. (in Japanese)
- Tomooka N, Vaughan D, Maxted N, Moss H. 2002. The Asian *Vigna*. Genus *Vigna* subgenus *Ceratotropis* genetic resources. 270 pages. Kluwer Academic Press.
- Tomooka N, Kuroda Y, Yokoyama T, Kashiwaba K, Kaga A, Isemura T, Vaughan D. 2005. Ecological survey and conservation of legumes - symbiotic rhizobia genetic diversity from Ishigaki Island, Okinawa, Japan, 2004. In Annual Report on Exploration and Introduction of Plant Genetic Resources. Vol. 21: 97 - 103.
- Tomooka N, Kaga A, Isemura T, Vaughan D.A, Srinives P, Somta P, Thadavong S, Bounphanousay C, Kanyavong K, Inthapanya P, Pandiyan M, Senthil N, Ramamoorthi N, Jaiwal PK, Jing T, Umezawa K, and Yokoyama T. 2010. *Vigna* Genetic Resources. In Proceedings of the 14th NIAS International Workshop on Genetic Resources "Genetics and Comparative Genomics of Legumes (*Glycine* and *Vigna*)". P. 11 - 21.
- Tomooka N, Kaga A, Isemura T, Vaughan D. 2011. *Vigna*. In (Chittaranjan Kole ed.) Wild Crop Relatives: Genomic and Breeding Resources. Legume Crops and Forages. Chapter 15, 291-311. Springer.
- Vaughan D.A., Tomooka N, Kaga A, Isemura T, Kuroda Y. 2010. *Glycine* Genetic Resources. In Proceedings of the 14th NIAS International Workshop on Genetic Resources "Genetics and Comparative Genomics of Legumes (*Glycine* and *Vigna*)". P. 1 - 9.

沖縄県石垣島，西表島，黒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，沖縄県石垣島，西表島および黒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6月28日～7月2日にかけて行った。調査の結果，ミヤコジマツルマメ(*Glycine koidzumii*) 1点，ミヤコグサ属野生種(*Lotus* sp.) 1点，ナガバハマササゲ(*Vigna luteola*) 1点，ハマササゲ(*Vigna marina*) 10点，オオヤブツルアズキ(*Vigna reflexo-pilosa*) 1点，ヒナアズキ(*Vigna riukiensis*) 13点，合計27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

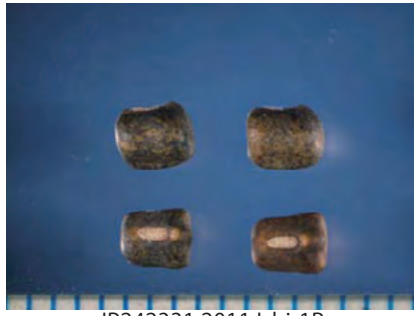
JP No. / Coll. No.	Coll. Date	Species name	Status	Collection Site	Collection Site (in Japanese)	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
JP242330 / 2011-Ishi-1A	28 June 2011	<i>Vigna luteola</i>	wild	Bunatabaru-kobashi, Maezato-Omoto, Ishigaki, Okinawa	沖縄県 石垣市 真栄里 - 於茂登 (おもと) 武那田原小橋 (ぶなたばるこばし) 横	N24-24-41	E124-12-40	19	clay	bulk	yes	no	river side (both side), wet habitat
JP242331 / 2011-Ishi-1B	28 June 2011	<i>Vigna reflexo-pilosa</i>	wild	Bunatabaru-kobashi, Maezato-Omoto, Ishigaki, Okinawa	沖縄県 石垣市 真栄里 - 於茂登 (おもと) 武那田原小橋 (ぶなたばるこばし) 横	N24-24-41	E124-12-40	19	clay	bulk	no	no	river side (west side)
JP242332 / 2011-Ishi-3 bulk	28 June 2011	<i>Vigna marina</i>	wild	Inoda beach, Ishigaki, Okinawa	沖縄県 石垣市 伊野田オートキャンプ場の砂浜	N24-28-2	E124-15-8	1	sand	bulk	yes	no	sandy beach, many pods are damaged by larva of butterfly
JP242333 / 2011-Ishi-3-1	28 June 2011	<i>Vigna marina</i>	wild	Inoda beach, Ishigaki, Okinawa	沖縄県 石垣市 伊野田オートキャンプ場の砂浜, 着莢の良い場所	N24-28-2	E124-15-8	1	sand	individual	no	no	sandy beach, collected at the site where plants showed good pod set, they also have large nodules
JP242334 / 2011-Ishi-4	28 June 2011	<i>Vigna marina</i>	wild	Ibaruma beach, Ishigaki, Okinawa	沖縄県 石垣市 伊原間ビーチ	N24-30-31	E124-17-1	13	sand	bulk	yes	no	sandy beach, growing unvigorously in this place, many pods are damaged by larvae of butterfly
JP242335 / 2011-Ishi-5-2	29 June 2011	<i>Vigna marina</i>	wild	Sukuji beach, Kabira, Ishigaki, Okinawa	沖縄県 石垣市 川平 底地ビーチ	N24-28-10	E124-7-32	1	sand	bulk	yes	no	sandy beach, less damage by larvae of butterfly
JP242336 / 2011-Ishi-5-3	29 June 2011	<i>Vigna marina</i>	wild	Sukuji beach, Kabira, Ishigaki, Okinawa	沖縄県 石垣市 川平 底地ビーチ	N24-28-10	E124-7-32	1	sand	bulk	no	no	beach
JP242337 / 2011-Ishi-7A-1	29 June 2011	<i>Vigna riukuensis</i>	wild	near Hirakubo lighthouse, Ishigaki, Okinawa	沖縄県 石垣市 平久保崎. 平久保灯台駐車場脇の山の向こう	N24-36-34	E124-18-53	60	gravel	bulk	no	no	top of the hill criff near the sea, heavy wind
JP242338 / 2011-Ishi-7A-2	29 June 2011	<i>Vigna riukuensis</i>	wild	near Hirakubo lighthouse, Ishigaki, Okinawa	沖縄県 石垣市 平久保崎. 平久保灯台駐車場脇の山に登る道の途中	N24-36-33.7	E124-18-58.1	60	gravel	bulk	no	no	growing on the slope of the hill criff near the sea
JP242339 / 2011-Ishi-7B	29 June 2011	<i>Glycine koidzumii</i>	wild	near Hirakubo lighthouse, Ishigaki, Okinawa	沖縄県 石垣市 平久保崎. 平久保灯台の足下	N24-36-37.1	E124-18-57.4	45	gravel	bulk	no	no	growing around Hirakubo lighthouse on the sea criff
JP242340 / 2011-Ishi-8	29 June 2011	<i>Vigna riukuensis</i>	wild	Kabira-Ishizaki, Ishigaki, Okinawa	沖縄県 石垣市 川平石崎.	N24-28-47.7	E124-6-56.3	33	sand	bulk	no	no	growing in a grass garden of Club Med.
JP242341 / 2011-Ishi-9	29 June 2011	<i>Vigna riukuensis</i>	wild	Uganzaki, Ishigaki, Okinawa	沖縄県 石垣市 御神崎 (うがんざき)	N24-27-08	E124-4-42.5	33	sand	bulk	no	no	growing on a grass in front of Uganzaki light-house
JP242342 / 2011-Ishi-10A-1	29 June 2011	<i>Vigna riukuensis</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-56.7	E124-6-47.1	9	sand	bulk	no	no	growing on a grass in Tojinbaka park
JP242343 / 2011-Ishi-10A-2	29 June 2011	<i>Vigna riukuensis</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-55.8	E124-6-46.5	8	sand	bulk	no	no	crawling ecotype growing on a grass in Tojinbaka park

Table 3 (Continued).

JP No. / Coll. No.	Coll. Date	Species name	Status	Collection Site	Collection Site (in Japanese)	Latitude	Longitude	Altitude (m)	Soil	Seed	Herbarium	Nodule	Remarks
JP242344 / 2011-Ishi-10A-3	29 June 2011	<i>Vigna riukiensis</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-56.1	E124-6-44.8	7	sand	bulk	no	no	growing on a grass at small park on the opposite side of Tojinbaka park
JP242345 / 2011-Ishi-10A-4	29 June 2011	<i>Vigna riukiensis</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-55.7	E124-6-44.8	65	sand	bulk	no	no	growing on a grass together with <i>V. marina</i> , at small park on the opposite side of Tojinbaka park, crawling type with small leaf
JP242346 / 2011-Ishi-10A-5	29 June 2011	<i>Vigna riukiensis</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-56.2	E124-6-44.2	7	sand	bulk	no	no	growing at small park on the opposite side of Tojinbaka park, climbing type with large leaflet, green and purple stem type mixed
JP242347 / 2011-Ishi-10B-1	29 June 2011	<i>Vigna marina</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-56	E124-6-44.7	6	sand	bulk	no	no	growing on a grass at small park on the opposite side of Tojinbaka park
JP242348 / 2011-Ishi-10B-2	29 June 2011	<i>Vigna marina</i>	wild	Tojinbaka, Ishigaki, Okinawa	沖縄県 石垣市 唐人墓	N24-21-55.6	E124-6-45.4	6	sand	bulk	no	no	climbing on the tree at small park on the opposite side of Tojinbaka park
JP242349 / 2011-Irio-1	30 June 2011	<i>Vigna marina</i>	wild	Haimita no Hama beach, Toyobaru, Taketomi, (Iriomote island), Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 (西表島) 豊原 南風見田の浜 (はいみたのはま)	N24-16-20	E123-50-03	5	sand	bulk	yes	no	growing on a sandy beach, a large population
JP242350 / 2011-Irio-3	30 June 2011	<i>Vigna marina</i>	wild	Hoshitate no Hama beach, Hoshitate, Taketomi, (Iriomote island), Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 (西表島) 干立, 星立の浜 (ほしたてのはま)	N24-23-42.0	E123-45-14.8	3	sand	bulk	no	no	growing on sandy beach and stone wall on the beach, plants growing on stone wall showed good pod setting
JP242351 / 2011-Irio-4	30 June 2011	<i>Vigna riukiensis</i>	wild	Yonara bridge, Taketomi, (Iriomote island), Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 (西表島) 与那良橋	N24-21-04.3	E123-55-40.8	12	sand	bulk	no	no	growing in a pasture near Yonara bridge
JP242352 / 2011-Irio-5 bulk	30 June 2011	<i>Vigna riukiensis</i>	wild	Near Nubaru, Taketomi, (Iriomote island), Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 (西表島) 野原付近	N24-21-37.9	E123-56-21.1	13	gravel	bulk	no	no	growing on a road side near Nubaru
JP242353 / 2011-Irio-5-1	30 June 2011	<i>Vigna riukiensis</i>	wild	Near Nubaru, Taketomi, (Iriomote island), Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 (西表島) 野原付近	N24-21-37.9	E123-56-21.1	13	gravel	bulk	no	no	growing on a road side near Nubaru, round leaflet
JP242354 / 2011-Irio-6	30 June 2011	<i>Vigna marina</i>	wild	Near Funara bridge, Taketomi, (Iriomote island), Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 (西表島) 船良橋	N24-22-00.5	E123-55-20.0	8	sand	bulk	no	no	growing on a stone wall between road and sandy beach near Funara bridge
JP242355 / 2011-Kuro-1	1 July 2011	<i>Lotus</i> sp.	wild	(Nakamoto beach, Kuroshima Island), Taketomi, Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 字黒島 (黒島, 仲本海岸)	N24-13-57.2	E123-59-48.9	7	gravel	bulk	no	no	growing on a rock at seashore
JP242356 / 2011-Kuro-3	1 July 2011	<i>Vigna riukiensis</i>	wild	(road side, between Kuroshima light-house and Agarisuji, Kuroshima Island), Taketomi, Yaeyama, Okinawa	沖縄県 八重山郡 竹富町 字黒島 (黒島, 黒島灯台と東筋集落の間の道路脇)	N24-13-38.2	E124-00-39.7	9	gravel	bulk	no	no	growing at road side beside pasture



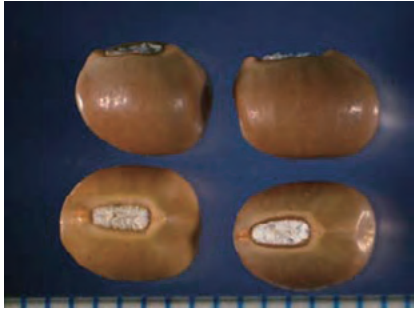
JP242330 2011 Ishi-1A



JP242331 2011 Ishi-1B



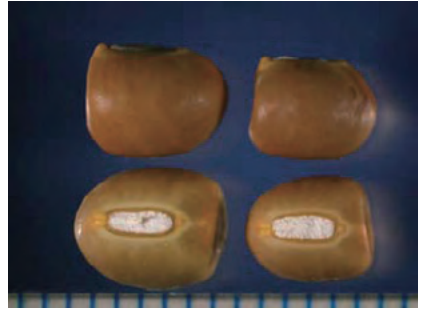
JP242332 2011 Ishi-3 bulk



JP242333 2011 Ishi-3-1



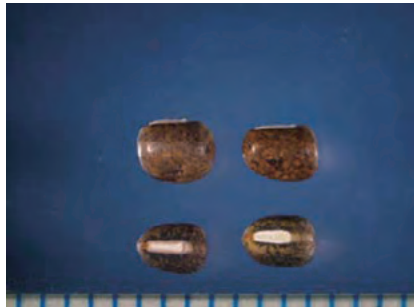
JP242334 2011 Ishi-4



JP242335 2011 Ishi-5-2



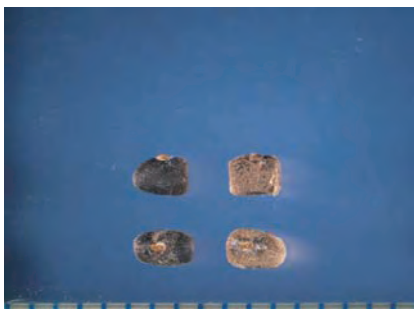
JP242336 2011 Ishi-5-3



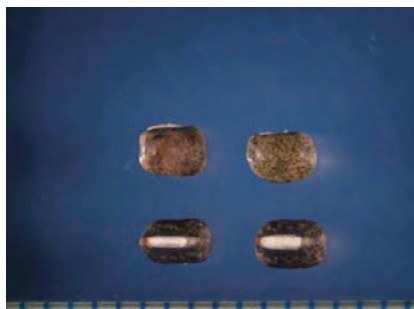
JP242337 2011 Ishi-7A-1



JP242338 2011 Ishi-7A-2



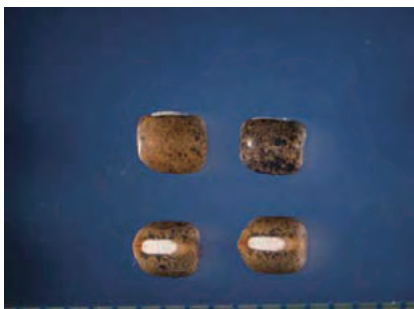
JP242339 2011 Ishi-7B



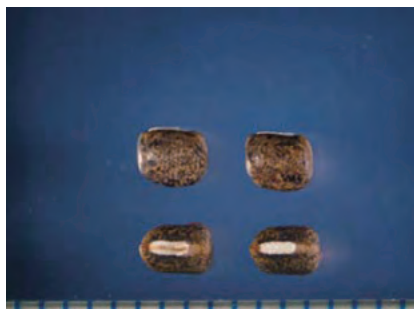
JP242340 2011 Ishi-8



JP242341 2011 Ishi-9



JP242342 2011 Ishi-10A-1



JP242343 2011 Ishi-10A-2



JP242344 2011 Ishi-10A-3



JP242345 2011 Ishi-10A-4



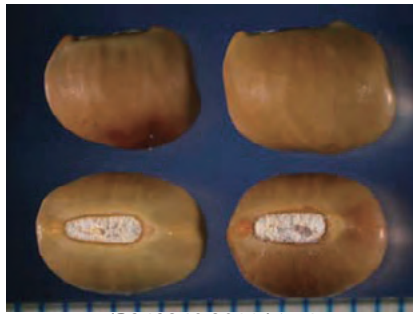
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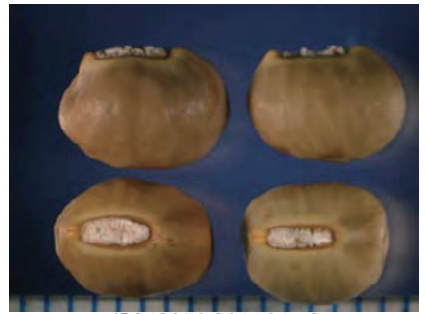
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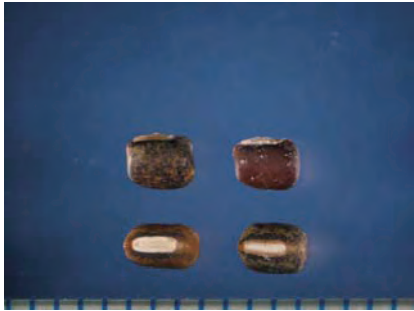
JP242348 2011 Ishi-10B-2



JP242349 2011 Irio-1



JP242350 2011 Irio-3



JP242351 2011 Irio-4



JP242352 2011 Irio-5 bulk



JP242353 2011 Irio-5-1



JP242354 2011 Irio-6



JP242355 2011 Kuro-1



JP242356 2011 Kuro-3



Photo 1. *V. luteola* (JP242330) and *V. reflexo-pilosa* (JP242331) were found at Ishi-1 site (Bunatabaru-kobashi, Ishigaki Is., 武那田原小橋, 石垣島)



Photo 2. At Ishi-1 site, *V. luteola* plants were growing sporadically along river side road. Root nodules were also collected.



Photo 3. Most of the pods of *V. marina* at Ishi-3 site (Inoda beach, Ishigaki Is., 伊野田ビーチ, 石垣島) had been damaged by larvae of butterfly.



Photo 4. At Ishi-5 site (Sukuji beach, Ishigaki Is., 底地ビーチ, 石垣島), many *V. marina* plants had been buried under sands by heavy wind. New shoots emerged from buried stems.



Photo 5. Some *V. marina* plants were parasitized by *Cassytha filiformis*, which sometimes totally killed *V. marina* plants (Sukuji beach, Ishigaki Is., 底地ビーチ, 石垣島)



Photo 6. *V. marina* plants can produce roots directly from their stems (Sukuji beach, Ishigaki Is., 底地ビーチ, 石垣島)



Photo 7. A collection site of *Vigna riukiensis* (JP242338) on the slope of small hill (Ishi-7 site, Hirakubo, Ishigaki Is., 平久保灯台横の丘斜面, 石垣島)



Photo 8. *V. riukiensis* plants (JP242339) were also growing on the top of the small hill where strong winds were prevailing (Hirakubo, Ishigaki Is., 平久保灯台横丘の頂上, 石垣島)



Photo 9. Thick and shiny small rounded leaflets are one of the specific characters of *V. riukuensis* (Hirakubo, Ishigaki Is., 平久保灯台横丘の頂上, 石垣島)



Photo 10. Collection of root nodules from *V. riukuensis* at Ishi-10 site (Road side small park opposite to Tojin baka park, Ishigaki Is., 唐人墓道路反対側の公園, 石垣島)



Photo 11. A habitat of *V. marina* (JP242349) at Irio-1 site (Haimita beach, Iriomote Is., 南風見田の浜, 西表島)



Photo 12. A habitat of *V. marina* (JP242350) at Irio-3 site (Hoshitate beach, Iriomote Is., 干立の浜, 西表島)



Photo 13. Plants of *V. riukuensis* (JP241352) growing on road side at Irio-5 site (Nubaru, Iriomote Is., 野原, 西表島)



Photo 14. *V. marina* plants (JP242354) growing on stone wall between beach and road (Irio-6 site, near Funara bridge, Iriomote Is., 船良橋, 西表島)



Photo 15. *V. marina* plants (JP242354) showed exceptionally good pod set percentage on the stone wall at Irio-6 site (near Funara bridge, Iriomote Is., 船良橋, 西表島)



Photo 16. A habitat of *V. riukuensis* at Kuro-3 site (between pasture and road, Kuroshima, 牧場と道路の間, 黒島)