

Collaborative Survey of Eggplant Genetic Resources in Lao PDR, 2018

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Original Paper

Collaborative Survey of Eggplant Genetic Resources in Lao PDR, 2018

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Summary

Under the Joint Research Agreement, the National Institute of Agrobiological Sciences [currently, integrated with the National Agriculture and Food Research Organization (NARO)], Japan, and the National Agriculture and Forestry Research Institute (NAFRI), Lao People's Democratic Republic (Lao PDR) have collaborated since 2014 to survey plant genetic resources in Lao PDR. The main objective of this survey was to collect samples of eggplant (*Solanum melongena* L.) and related crop species from the Bolikhamxay and Khammounane provinces of central Lao PDR. Between November 5 and 21, 2018, we collected 135 samples, including *S. melongena* (102) and other *Solanum* spp. (33). We found a wide diversity of eggplant landraces in central Lao PDR, with variation in fruit shape (flattened, globular, ovoid, pear shaped, ellipsoid, and cylindrical), size (19.2 to 417 mm long), and color (purple, green, and white); spineless landraces were also common. The collected seeds were deposited at NAFRI; a subset of the collection will be transferred to the Genetic Resources Center, NARO, Japan, as backup under the Standard Material Transfer Agreement of the International Treaty on Plant Genetic Resources for Food and Agriculture. Seeds from these genetic resources will be reproduced via self-pollination, and the NAFRI staff will evaluate the characteristics of the plant material in the next season. We plan to evaluate the accessions' morphological characteristics and resistance to *Verticillium* wilt, *Fusarium* wilt, bacterial wilt, powdery mildew, and nematodes in Japan.

KEY WORDS: *Solanum*, eggplant, Lao People's Democratic Republic, NAFRI, HRC, NARO, PGRAsia

Introduction

Since 2006, the National Institute of Agrobiological Sciences [NIAS, currently integrated with the National Agriculture and Food Research Organization (NARO)] of Japan and the National Agriculture and Forestry Research Institute (NAFRI) of Lao People's Democratic Republic (Lao PDR) have conducted collaborative surveys in Lao PDR for obtaining plant genetic resources under the Memorandum of Agreement and the Memorandum of Understanding (Sakata *et al.* 2008; Saito *et al.* 2009; Matsunaga *et al.* 2010; Okuizumi *et al.* 2011, 2013; Kawase *et al.* 2012).

In 2014, the NIAS and the NAFRI established a Joint Research Agreement under the Plant Genetic Resources in Asia (PGRAsia) project funded by the Ministry of Agriculture, Forestry and Fisheries of Japan, to collect plant genetic resources (Okuizumi *et al.* 2016). This report describes the fifth survey conducted under the PGRAsia project to collect vegetable plant genetic resources from Lao PDR. The exploration sites were the northern provinces of Houaphan, Xiengkhouang, Oudomxay, Phongsaly, Luang Namtha, and Bou Keo in 2014, 2015, and 2016 (Saito *et al.* 2015, 2016, 2017) and the southern provinces of Sekong and Attapeu in 2017 (Hamato *et al.* 2018). During each exploration, 134, 124, 108, and 200 samples of eggplant (*Solanum* spp., including crop wild relatives), respectively, were collected. Central Lao PDR is a mountainous area (Photo 1), and many minority populations live there; at least 48 ethnic tribes have been reported in Lao PDR (Chamberlain 2003). Because of the logistics of reaching and interacting with the minority populations, many undescribed eggplant landraces are expected to still exist in this region. In this survey, we collected new plant materials from many villages in the central provinces of Bolikhamxay and Khammounane.

Methods

Before the survey, Dr. Sisaphaithong collected information on eggplant genetic resources in the provinces of Bolikhamxay and Khammounane. Based on this information, we surveyed the area between November 5 and 21, 2018 (Table 1, Fig. 1). We rented a car (Photo 2) to visit local markets (Photo 3), homes (Photo 4), and agricultural fields to obtain samples of fruits and seeds. Work at each site included confirming the GPS location by using a GPS receiver (eTrex 30J; Garmin international, Inc., Kansas, USA); collecting the samples; and interviewing locals to obtain information about the collected plant materials, such as the local names, usage, and area of cultivation (Photo 5). The principal goal was to collect only eggplant landraces. On November 6, 2018, we visited the Horticultural Research Center (HRC) to explain the objectives and plan our survey with the director, Dr. Bounneuang Douangboupaha, and staff members (Photo 6). After the survey, on November 19, 2018, we revisited the HRC and extracted seeds from the fruit samples and reported our preliminary results.

Results

We surveyed over 1,900 km (Table 1) and collected 135 samples from 42 villages in 11 districts of the two provinces (Table 2). The collection included the species *Solanum melongena* L. (102 samples), *Solanum violaceum* L. (16), *Solanum torvum* Sw. (14), *Solanum aethiopicum* L. (2), and *Solanum* sp. (1). (Tables 2, 3, and 4). Following the survey, the seeds we collected were deposited at the NAFRI, and a subset of the collection will be transferred to the Genetic Resources Center, NARO (NGRC), Japan, as

Table 1. Itinerary of the survey

Date	Day	Itinerary	Stay	Distance covered (km)
5-Nov	Mon	Chubu 11:00 (TG645) - 15:40 Bangkok 18:35 (TG574) - 19:45 Vientiane	Vientiane	
6-Nov	Tue	Visit HRC, Discuss importing eggplant seeds & Prepare the survey	Vientiane	
7-Nov	Wed	Vientiane -- PAFO, Bolikhamxay province	Paksan	(165)
8-Nov	Thu	Bolikhon district, Bolikhamxay province	Lak 20	253
9-Nov	Fri	Khamkeut district, Bolikhamxay province	Viengthong	192
10-Nov	Sat	Viengthong district, Bolikhamxay province	Pakkading	174
11-Nov	Sun	Pakkading district, Bolikhamxay province	Paksan	151
12-Nov	Mon	PAFO, Thakhek District, Khammouane province	Thakhek	250
13-Nov	Tue	Nongbok and Xebangfai district, Khammouane province	Thakhek	204
14-Nov	Wed	Nhommalath district, Khammouane province	Nhommalath	141
15-Nov	Thu	Mahaxay district, Khammouane province	Nakai	124
16-Nov	Fri	Nakai district, Khammouane province	Thakhek	176
17-Nov	Sat	Hinboun district, Khammouane province	Thakhek	264
18-Nov	Sun	Return from Khammounane province to Vientiane	Vientiane	(345)
19-Nov	Mon	Visit HRC & Discuss	Vientiane	
20-Nov	Tue	Vientiane 20:30 (TG575) -- 21:35 Bangkok	on flight	
21-Nov	Wed	Bangkok 00:05 (TG644) -- 7:30 Chubu		Total 1929

a backup under the Standard Material Transfer Agreement of the International Treaty on Plant Genetic Resources for Food and Agriculture.

The remainder of this section describes the day-to-day details of our survey. Collected samples were mature *S. melongena* fruits, unless stated otherwise.

November 7: We traveled 3 h from Vientiane, the capital of Lao PDR, to Paksan (Pakxan) district on Route 13S. We visited the Provincial Agriculture and Forestry Office (PAFO) of the Bolikhamxay province (Photo 7) to explain our plans and objectives to the director, Mr. Phonesavanh. He said that this area was damaged by flooding the previous year, and poor road conditions might disrupt our survey in the mountainous area.

November 8: In the morning, we visited the district Agriculture and Forestry Office (DAFO) of Bolikhon district (Photo 8) to explain our survey to the staff members. After the meeting, a deputy director of the DAFO joined us to survey the district. We collected the first sample (No. 1), which was a round green fruit (Photo 9), in Handonkoun village. In the same village, we collected six samples (Nos. 1–6), including *S. torvum* (No. 2; Photo 10) and *S. violaceum* (No. 5; Photo 11). Subsequently, we traveled 2.5 h from Paksan to Lak 20 (Lak xao) via Nam Sang on Route 8. On the way, we surveyed a local market and collected five samples (Nos. 7–11; Photo 12) at Noug porng village.

November 9: We visited the DAFO of Khamkeut district, and a staff member of the DAFO joined us to help in our survey. We surveyed four villages in the Khamkeut district. First, we collected eight samples (Nos. 12–19), including *S. torvum* and *S. violaceum*, at Narm phao village. Next, we moved to Phon Sy village and collected five samples (Nos. 20–24). At this village, we found an empty seed bag of an imported commercial cultivar (Photo 13), and we found a big purple eggplant fruit, which was unusual in the central Lao PDR. At the third village of Nong Maix, we collected a green round sample (No. 25). After dropping

off the DAFO staff member, we continued the survey and collected two samples at Lark Sep village (Nos. 26 and 27).

November 10: First, we picked up the DAFO staff member of Viengthong district near his residence. Subsequently, we visited Vung Hin village and surveyed the backyards. At one site, some kinds of eggplant were cultivated, which enabled us to collect four samples (Nos. 28-31). We also found two-year-old eggplant trees, and a local farmer informed that he has been cultivating eggplant trees for four years. Next,

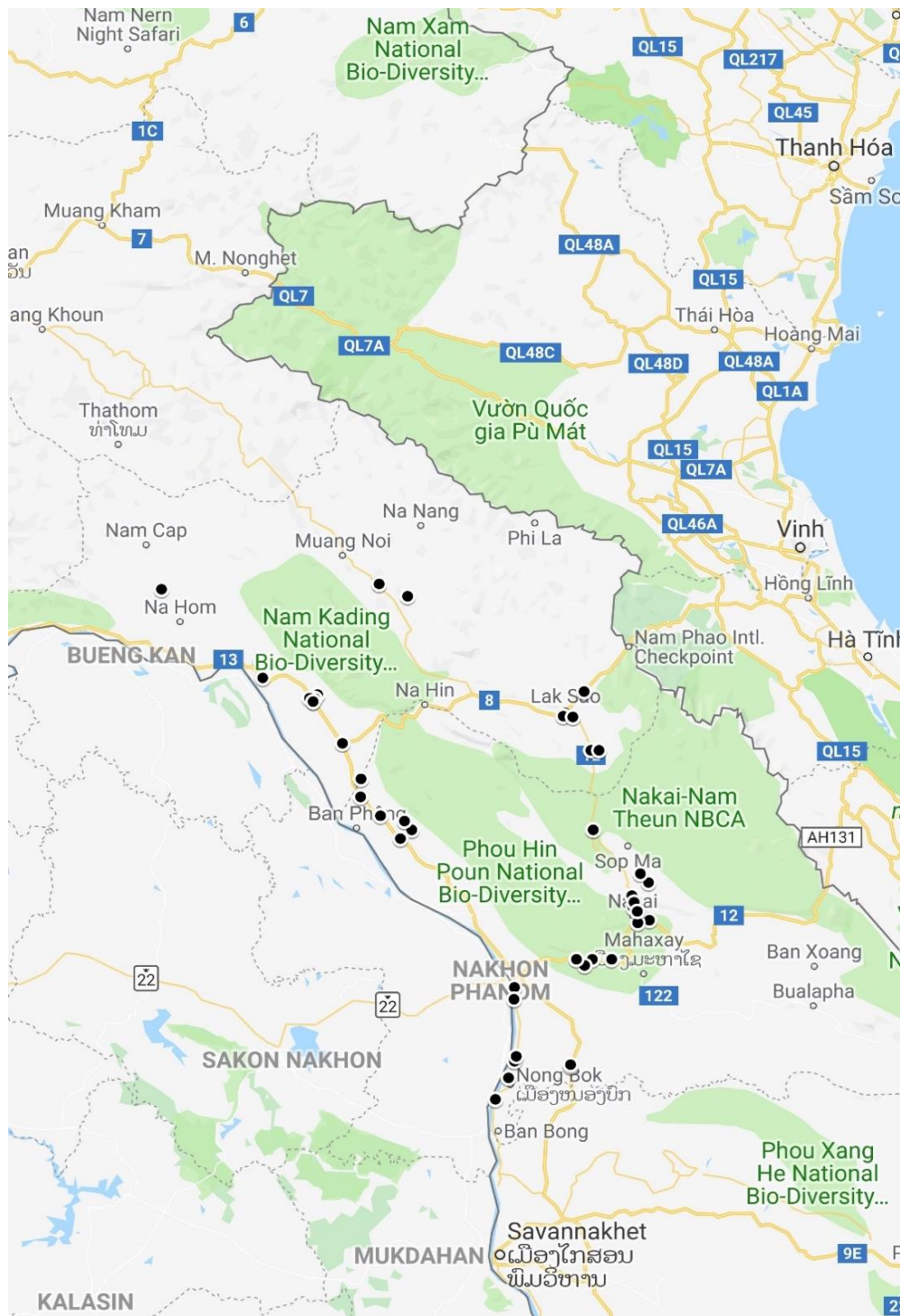


Fig. 1. Main sites (●) visited during the 2018 survey in central Lao PDR plotted on a map provided by Google Inc.

Table 2. Accessions collected

Province	District	Number of villages	<i>Solanum melongena</i>	<i>Solanum violaceum</i>	<i>Solanum torvum</i>	<i>Solanum aethiopicum</i>	<i>Solanum</i> sp.	Total
Bolikhamxay	Bolikhan	2	9	1	1	0	0	11
Bolikhamxay	Khamkeut	4	12	3	1	0	0	16
Bolikhamxay	Viengthong	2	15	0	0	2	1	18
Bolikhamxay	Pakkading	7	13	3	2	0	0	18
Khammouane	Thakhek	2	5	0	1	0	0	6
Khammouane	Nongbok	4	7	1	1	0	0	9
Khammouane	Xebangfai	2	3	1	0	0	0	4
Khammouane	Nhommalath	6	9	3	2	0	0	14
Khammouane	Mahaxay	4	16	1	2	0	0	19
Khammouane	Nakai	3	4	1	2	0	0	7
Khammouane	Hinboun	6	9	2	2	0	0	13
Total		42	102	16	14	2	1	135

we moved to a mountainous field in Vung Hin village, where we walked around for 3 h (Photo 14). At the base of the mountain, we found an extensive cassava field, and, on the hillside, many crops, including upland rice, chili pepper, papaya, and cucurbit, but not eggplant, were planted. Almost all the phenotypes found in this survey occurred at this site; hence, we collected eleven samples (Nos. 32–39, 41, 42, 44). These included a rare type that bears a very large fruit (No. 42; Photo 15). In addition to *S. melongena*, many plants of *S. aethiopicum* were planted at the same site, and two types of samples were collected (Nos. 40 and 43; Photos 16 and 17). After this lengthy survey, we moved to Phondou village, where we collected a type of *Solanum* sp. (No. 45; Photo 18) that seemed to be a typical landrace in Vietnam, according to a local farmer. In the evening, we moved to the hotel and extracted seeds from the rotten fruits and dried them (Photo 19).

November 11: We picked up a DAFO staff member of Pakkading district and moved to Vieng Khome village where we collected one sample of *S. melongena* (No. 46) and *S. violaceum* (No. 47). Flowers of sample No. 46 were white. This was the first *S. melongena* sample with white flowers in this survey. Only 10 of the samples collected in this survey had white flowers. Next, we went to the following five villages in succession during the morning hours: Na Hin (Nos. 48–50), Na Kheua Ni (Nos. 51 and 52), Na Kheua Nork (No. 53), Nam deua (Nos. 54–60), and Na keua noy (Nos. 61 and 62). The samples collected included 11 eggplants (Nos. 48, 49, 52–55, 58–62), two samples of *S. violaceum* (Nos. 50, 57), and two samples of *S. torvum* (Nos. 51, 56). The fruit skin color of sample No. 60 was white, which was rare in this survey as only three of all the samples collected had white skins. During the survey in Na Hin village, we found a kind of solanaceous tree (Photo 20) that had never been seen in Japan. It bore very few fruits. After lunch, on the way to the hotel, we collected a sample of *S. melongena* (No. 63) from Had Say Khome village. At the end of the day, we extracted seeds from rotten samples.

November 12: We traveled about 3 h to Thakhek on Route 8 and visited the PAFO of Khammouane province (Photo 21) to explain our plans and objectives to the staff. The staff was afraid that there were few landraces in the district of Nong Bok and Mahaxay. Immediately afterwards, we met the head of the Thakhek district's agriculture section; he was worried about the effect of flooding that had occurred last year. Subsequently, a DAFO staff member joined us, and we started the survey. In the village of Lao Pou Khome, we collected one sample (No. 64) that had heavy spines on the calyx, leaf, and stem (Photo 22). In the next village of Muang Sum, four eggplant samples (Nos. 65–68) and one sample of *S. torvum* (No. 69) were collected. Sample No. 68 had very big fruit (Photo 23). It was the last one, hence, a local farmer

cut it, and we shared it with him. At the collecting site of sample No. 69, we noted disease symptoms of powdery mildew (Photo 24). It was the first time since 2014 that we had found this symptom in Lao PDR during the PGRAsia project.

November 13: In the morning, a DAFO staff member of Nongbok district joined us. He contacted some local farmers, and they helped us with our survey. In Dome kiew neua village, we walked around and collected three samples (Nos. 70-72) with them. Next, we visited an agricultural field on the banks of the Mekong River and found wilted plants that might have been damaged by bacterial wilt (Photo 25). We asked a farmer to provide a wilted plant for checking for the existence of bacteria. We continued the survey until lunch and collected three samples (Nos. 73-75) in the villages of Dong khuang and Song Mung Tai. After lunch, we visited three villages and collected a total of seven samples from the villages of Koud gup (Nos. 76-78), Beung Hou Na Tai (Nos. 79-81), and Beung Hou Na Neua (No. 82). Among them, one sample (No. 82; Photo 26) had only one seed. The plant bore big green fruits according to a farmer. We visited an integrated farm, in which many vegetable crops were cultivated (Photo 27); imported seeds seemed to have been used in this farm. In this village, the water level reached by flooding in the previous year was traced on a wall (Photo 28). At dinner, we ate grilled eggplant salad (Photo 29). After the survey, at the hotel, we confirmed the existence of bacteria on the wilted plant collected from the banks of the Mekong River by using a simplified method (Photo 30). We extracted seeds from the collected samples.

November 14: First, we visited the DAFO of Nhommalath district and explained the objectives and plan of our survey to the director (Photo 31). Subsequently, a member of the DAFO joined us. In Yommalarn Neua village, we collected two samples of *S. violaceum* (Nos. 83 and 84) and one sample of *S. torvum* (No. 85). We visited additional two villages (Na poo and Pom khome) before lunch and three villages (Sarng keo, Thard kor bong, and Nounng ping) after lunch. A total of eight eggplant samples (Nos. 86, 87, 90 - 96), one sample of *S. violaceum* (No. 88), and one of *S. torvum* (No. 89) were collected. At the end of the day, we extracted seeds from rotten fruits and dried them as usual.

November 15: We visited the DAFO of Mahaxay district and talk to the head of the DAFO about the objectives of this survey (Photo 32). The head of DAFO informed us about the damage by flooding in the previous year. He informed us that 56 of the 67 villages in Mahaxay district were flooded. In addition, the water level rose 2 m in 14 villages. After the meeting, we visited a mountainous agronomic field (Photo 33) in Na Toung village, where nine samples were collected (Nos. 97-105). After lunch, we surveyed three villages (Kuan Kuay, Na doo, and Na Khome) where 10 samples were collected (Nos. 106-115), including a sample of *S. violaceum* (No. 106) and *S. torvum* (No. 107). After the survey, we extracted seeds from eggplant fruits already collected.

November 16: For the driver's convenience, the driver and rented car were changed. First, we visited the DAFO of Nakai district and talked with the deputy director (Photo 34). In the village of Tha Lung, we collected five samples (Nos. 116-120). In the villages of Sok On and Buo Ma, we collected one sample each of *S. torvum* (No. 121) and *S. melongena* (No. 122). In the Tha Lung village, we ate raw eggplant fruit with boiled sword bean for lunch (Photo 35). Next, we moved to the hotel and organized our data.

November 17: First, we picked up a DAFO staff member of Hinboun district on the road and visited four villages: Pank Teuk (No. 123), Huaydeua (Nos. 124 and 125), Darn hee (No. 126), and Phon Sa Eat (No. 127) before lunch. Near the villages, a large dam lake (Photo 36) was located. Residents in these villages were moved in 2006 in order to construct the power generation dam. After lunch, the DAFO staff contacted a farmer who lived in Phon dee village, which was near the villages where different kinds eggplant and related species were cultivated. However, the road to reach his village was in a very poor condition; hence, the farmer brought us some samples on a motorcycle. With his help, we collected two samples of *S. melongena* (No. 128 and 129) except an immature fruit sample. Next, six samples of *S. melongena* (Nos. 130-135) were collected in Kar Toep village. We had then completed the 11-day survey in Lao PDR.

November 18: We returned to Vientiane on Route 13S in 8 h.

November 19: In Vientiane, we sorted the data and photographs in the morning; in the afternoon, we visited the HRC to report our preliminary results. The HRC staff members extracted the seeds from our fruit collection and dried them.

Discussion

In a previous survey in November, it rained periodically (Saito *et al.* 2016, 2017; Hamato *et al.* 2018), although the rainy season in Lao PDR is usually over by the end of October. Fortunately, it did not rain in 2018, and the survey described in this project proceeded smoothly. However, in recent years, people's lives have been threatened by heavy rain and flooding year after year. In July 2018, the dam that was under construction in Attapeu province was damaged, heavily flooding many villages and making world news. Climate change may result in damage to agricultural fields and threaten conservation of genetic resources. The loss of the genetic resources is a major problem that might hinder the discovery of unutilized plant materials in the future.

Because of the language barrier, we could not communicate directly with the different ethnic groups. However, we could communicate with them indirectly through the PAFO and the DAFO staff members

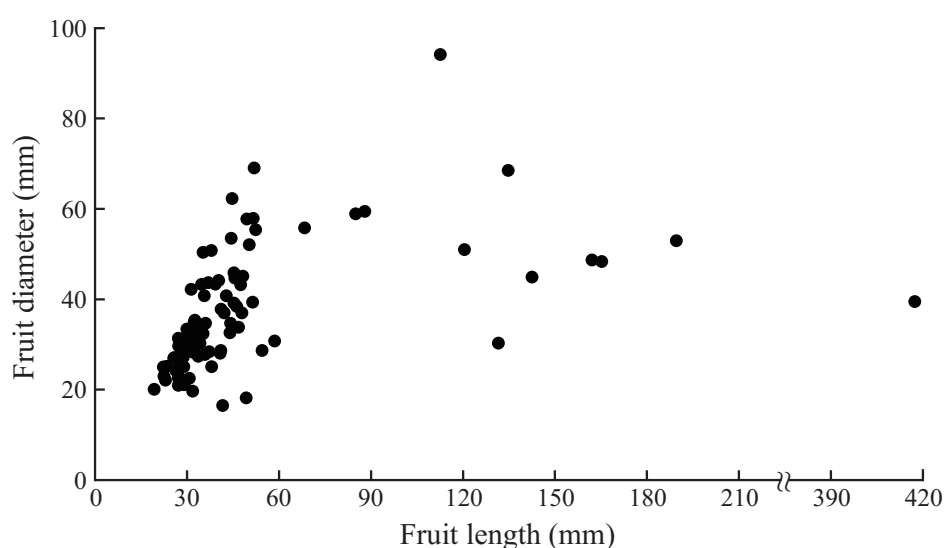


Fig. 2. Distribution of 100 *Solanum melongena* fruit samples (excluding Nos. 82 and 111) on a scatter plot based on length versus diameter.

acting as translators. We found that the eggplants of Bolikhamxay and Khammounane varied considerably in shape (flattened, globular, ovoid, pear shaped, ellipsoid, or cylindrical), fruit length (19.2 to 417 mm), and fruit skin colors (purple, green, or white; Table 3, Fig. 2), and spineless landraces were mostly found in these provinces, as we had observed in northern and southern Lao PDR (Saito *et al.* 2016, 2017; Hamato *et al.* 2018). As in our previous study (Miyatake *et al.* 2019), more genetic diversity was detected among landraces than has been reported before in Lao PDR, and the results may reflect the phenotypic diversity that we observed among samples collected in Lao PDR. For more detailed analysis, additional molecular studies are required for understanding the genetic diversity among the samples collected in the PGRAsia project.

As we reported previously, people in northern Lao PDR eat mature as well as immature fruits, rendering it easier to collect seeds of eggplant landraces. Conversely, the people in southern and central Lao PDR rarely eat mature fruits. In this survey, we could easily collect mature fruits, because we mainly went around the backyards where the natives could not harvest all the young fruits. Usually, some mature fruits could be seen on eggplant trees.

Although we focused on *S. melongena*, we also collected *S. violaceum*, *S. torvum*, and *S. aethiopicum*. In our previous survey in northern Lao PDR, we collected some *S. macrocarpon* samples; however, we did not find any *S. macrocarpon* L. in central or southern Lao PDR. Interestingly, we found symptoms of important diseases of eggplant, such as powdery mildew and bacterial wilt (Photos 24 and 25). At the same site where we observed the above symptoms, many other plants seemed to be healthy, indicating that some of the landraces were possibly resistant to these diseases.

Finally, although 135 samples were collected in this survey, the heads of the PAFOs and DAFOs indicated that many other landraces are cultivated in the mountainous areas that were inaccessible to us because of the poor road conditions. We need to use appropriate vehicles such as four-wheel drive vehicles, and survey these areas, in order to collect more landraces.

We discussed and planned future cooperative activities with the HRC staff, including a plan to train them to evaluate eggplant genetic resources and breed new cultivars. The seeds collected will be propagated by self-pollination, and the HRC staff members will evaluate these new plant resources in the following season. The seeds produced in the following year at the HRC will be shared among government representatives of the PGRAsia project in Lao PDR and Japan. In Japan, we also plan to evaluate the eggplants' morphological characteristics and resistance to *Verticillium* wilt, *Fusarium* wilt, bacterial wilt, powdery mildew, and nematodes.

Acknowledgments

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ラオスにおけるナス遺伝資源の共同探索，2018 年

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和文摘要

本報告は、独立行政法人農業生物資源研究所とラオス農林省国立農林業研究所 (NAFRI) との間で 2014 年に締結された共同研究協定 (JRA) に基づいて行われたラオス国における 2018 年のナス遺伝資源の調査報告である。調査は、2018 年 11 月 5～21 日にかけて実施された。今回、我々はラオス国中央地域であるボリカムサイ県およびカムアン県を調査し、ナス栽培種 *Solanum melongena* 102 点およびナス近縁種を 33 点の合計 135 点の種子サンプルを収集した。当該地域におけるナスの多様性は高く、果形や果色に広い変異が観察された。また、とげなし性の在来種が多かったことは興味深い。収集した遺伝資源の種子は、NAFRI において保存されるとともに、定型の素材移転契約 (SMTA) を用いて農研機構遺伝資源センターに移転され、保存される予定である。また、NAFRI では、これら遺伝資源の種子を自殖による増殖の後、特性調査が行われる予定である。さらに、日本では、土壌伝染性病害虫への抵抗性を含む特性が調査される予定である。

Table 3. Characteristics of the accessions collected during the 2018 survey in central Lao PDR

Collection No.	Harvested fruit (immature fruit)				Skin color of mature fruit	Color of flower	Spiny (1) or spineless (0)			Collected from (tribes)	Remarks
	Skin color	Length (mm)	Length/Diameter	Shape			Calyx	Stem	Leaf		
1	Whitish Green	32.4	1.00	Globular	Yellow	Purple	0	0	0	Mery	A little hard skin
2	Green	15.6	0.98	Globular	Brown	White	0	1	0	Mery	<i>Solanum torvum</i> , a little slender fruit
3	Whitish Green	30.7	1.01	Globular	Yellow	Purple	0	0	0	Mery	A little soft skin
4	Whitish Green	27.2	0.92	Globular	Yellow	Purple	1	1	1	Mery	Hard spines
5	Green	11.0	0.90	Globular	Orange	White	0	0	0	Mery	<i>Solanum violaceum</i>
6	Whitish Green	27.4	1.21	Globular	Yellow	Purple	0	0	0	Mery	
7	-	45.2	0.98	Pear shaped	Yellow	-	0	-	-	-	Only mature fruits
8	-	35.2	0.70	Flattened	Yellow	-	0	-	-	-	Only mature fruits
9	-	44.6	0.72	Flattened	Yellow	-	0	-	-	-	Only mature fruits
10	-	28.0	0.90	Flattened	Yellow	-	1	-	-	-	Only mature fruits
11	-	36.9	0.84	Flattened	Yellow	-	0	-	-	-	Only mature fruits
12	Whitish Green	47.8	1.29	Ovoid	Yellow	Purple	0	0	0	Mery	
13	Whitish Green	35.1	1.02	Globular	Yellow	Purple	0	0	0	Mery	
14	Whitish Green	34.6	1.07	Globular	Yellow	Purple	0	0	0	Mery	Ribs on fruit
15	Green	13.5	1.02	Globular	Brown	White	0	1	0	Mery	<i>Solanum torvum</i>
16	Pale Green	10.2	0.96	Globular	Orange	White	0	0	0	Mery	<i>Solanum violaceum</i>
17	Whitish Green	32.5	0.92	Flattened	Yellow	Purple	1	1	1	Mery	
18	Whitish Green	33.6	1.23	Ovoid	Yellow	Purple	0	0	0	Mery	
19	Whitish Green	46.1	1.20	Ovoid	Yellow	-	1	1	1	Mery	No flowers were observed
20	Whitish Green	28.9	0.97	Globular	Yellow	Purple	1	1	1	Mery	
21	Green	8.9	0.93	Globular	Orange	Purple	1	1	1	Mery	<i>Solanum violaceum</i>
22	Whitish Green	32.3	0.92	Globular	Yellow	Purple	1	1	1	Mery	
23	Whitish Green	29.4	0.96	Globular	Yellow	Purple	0	0	0	Mery	
24	Whitish Green	39.2	0.90	Flattened	Yellow	Purple	1	1	1	Mery	
25	Whitish Green	35.2	1.09	Ovoid	Yellow	Purple	1	1	1	Mery	
26	Whitish Green	44.3	0.83	Flattened	Yellow	-	1	0	0	Man	No flowers were observed
27	Pale Green	9.7	0.84	Globular	Orange	White	0	0	0	Man	<i>Solanum violaceum</i>
28	Greenish Purple	162.0	3.33	Cylindrical	Yellow	-	0	0	0	Mong	No flowers were observed
29	Pale purple	189.6	3.58	Cylindrical	Yellow	Purple	0	0	0	Mong	
30	Purple	142.5	3.17	Cylindrical	Yellow	Purple	0	0	0	Mong	
31	Whitish Green	45.5	1.02	Globular	Yellow	Purple	0	0	0	Mong	Ribs on fruit
32	Whitish Green	51.5	0.89	Flattened	Yellow	-	0	0	0	Mong	No flowers were observed
33	Purple	131.5	4.34	Cylindrical	Yellow	Purple	1	0	0	Mong	
34	Whitish Green	48.1	1.07	Ellipsoid	Yellow	Purple	0	0	0	Mong	
35	Whitish Green	134.7	1.97	Ellipsoid	Yellow	-	0	0	0	Mong	No flowers were observed
36	Whitish Green	87.9	1.48	Ellipsoid	Yellow	Purple	1	0	0	Mong	Partially be tinged with purple on skin
37	Greenish Purple	68.3	1.22	Ovoid	Yellow	-	1	0	0	Mong	No flowers were observed
38	-	49.4	0.85	Flattened	Yellow	-	0	0	0	Mong	Only mature fruits
39	Whitish Green	84.9	1.44	Ellipsoid	Yellow	Purple	1	0	0	Mong	Partially tinged with purple on skin
40	Pale Green	61.6	1.29	Ellipsoid	Orange	White	0	0	0	Mong	<i>Solanum aethiopicum</i>
41	-	165.2	3.41	Cylindrical	Yellow	-	1	0	0	Mong	Only mature fruits
42	Pale Green	417.0	10.56	Cylindrical	Yellow	Purple	0	0	0	Mong	
43	Green	29.5	0.54	Flattened	Orange	White	0	0	0	Mong	<i>Solanum aethiopicum</i>
44	Whitish Green	120.4	2.36	Ellipsoid	Yellow	Purple	0	0	0	Mong	
45	Whitish Green	8.5	0.98	Globular	Orange	Purple	0	1	1	Kung	<i>Solanum</i> sp.
46	Whitish Green	29.6	0.94	Flattened	Yellow	White	0	0	0	Lao Loum	
47	Green	11.1	1.02	Globular	Orange	Purple	0	0	0	Lao Loum	<i>Solanum violaceum</i>
48	Whitish Green	27.1	0.86	Flattened	Yellow	Pale purple	0	0	0	Lao Loum	
49	Whitish Green	42.0	1.14	Pear shaped	Yellow	Purple	0	0	0	Lao Loum	Ribs on fruit
50	Pale Green	10.0	0.95	Globular	Orange	Purple	0	0	0	Lao Loum	<i>Solanum violaceum</i>
51	Pale Green	14.9	1.02	Globular	Brown	White	0	1	0	Lao Loum	<i>Solanum torvum</i>
52	Whitish Green	32.4	1.11	Ovoid	-	Purple	0	0	0	Lao Loum	Seeds were given by farmers
53	Whitish Green	23.3	0.92	Globular	Yellow	Purple	0	0	0	Lao Loum	
54	-	32.5	0.96	Flattened	Yellow	-	0	0	0	Lao Loum	Only mature fruits
55	Whitish Green	28.7	1.06	Flattened	Yellow	Purple	0	0	0	Lao Loum	
56	Pale Green	14.0	1.06	Globular	Brown	White	0	1	1	Lao Loum & Tai Deaeng	<i>Solanum torvum</i> , a little slender fruit
57	Green	9.8	1.00	Globular	Orange	Purple	1	1	1	Lao Loum & Tai Deaeng	<i>Solanum violaceum</i>
58	Whitish Green	29.4	0.99	Globular	Yellow	-	1	1	1	Lao Loum & Tai Deaeng	No flowers were observed
59	Whitish Green	28.6	0.93	Flattened	Yellow	White	0	0	0	Lao Loum & Tai Deaeng	

Table 3. (Continued).

Collection No.	Harvested fruit (immature fruit)				Skin color of mature fruit	Color of flower	Spiny (1) or spineless (0)			Collected from (tribes)	Remarks
	Skin color	Length (mm)	Length/Diameter	Shape			Calyx	Stem	Leaf		
60	White	27.1	1.20	Ovoid	Yellow	-	0	0	0	Lao Loum & Tai Deaeng	No flowers were observed
61	Whitish Green	38.0	1.51	Ovoid	Yellow	-	0	0	0	Lao Loum	No flowers were observed
62	-	49.2	2.70	Ellipsoid	Yellow	-	0	0	0	Lao Loum	Only mature fruits
63	Whitish Green	37.2	1.31	Ovoid	Yellow	Purple	0	0	0	Lao Loum	
64	Whitish Green	22.4	0.97	Globular	Yellow	Purple	1	1	1	Lao Loum	Hard spines
65	Whitish Green	41.5	2.52	Cylindrical	Yellow	Purple	0	0	0	Lao Loum	
66	Whitish Green	44.1	1.27	Ovoid	Yellow	Purple	0	0	0	Lao Loum	
67	Whitish Green	51.3	1.30	Ellipsoid	Yellow	Purple	0	0	0	Lao Loum	
68	Whitish Green	112.6	1.20	Ovoid	Yellow	White	0	0	0	Lao Loum	Partially tinged with purple on skin
69	Pale Green	12.9	1.03	Globular	Brown	White	0	1	0	Lao Loum	<i>Solanum torvum</i>
70	Whitish Green	25.6	0.95	Globular	Yellow	Purple	1	1	1	Lao Loum	
71	Pale Green	10.4	1.03	Globular	Orange	Purple	0	0	0	Lao Loum	<i>Solanum violaceum</i> , partially tinged with purple on skin
72	Whitish Green	46.7	1.38	Ovoid	Yellow	Purple	0	0	0	Lao Loum	
73	Pale Green	34.2	1.13	Globular	Yellow	White	0	0	0	Lao Loum	
74	Whitish Green	25.8	0.95	Globular	Yellow	White	0	0	0	Phou Thai	
75	Pale Green	13.8	1.05	Globular	Brown	White	0	1	0	Phou Thai	<i>Solanum torvum</i>
76	Whitish Green	47.4	1.10	Pear shaped	Yellow	Purple	0	0	0	Phou Thai	A little bitter
77	Whitish Green	52.3	0.94	Globular	Yellow	Purple	0	0	0	Phou Thai	A little sweet
78	-	50.2	0.96	Globular	Yellow	Purple	0	0	0	Phou Thai	No young fruits were observed
79	Whitish Green	31.3	0.74	Flattened	Yellow	White	0	0	0	Lao Therng	
80	Green	9.3	0.91	Globular	Orange	Purple	0	1	1	Lao Therng	<i>Solanum violaceum</i>
81	-	22.2	0.89	Globular	Yellow	-	1	1	1	Lao Therng	Only mature fruits
82	Green	-	-	-	-	-	-	-	-	Lao Therng	Only seeds
83	Pale Green	10.1	0.97	Globular	Orange	-	0	0	0	Lao Loum	<i>Solanum violaceum</i> , No flowers were observed
84	Pale Green	8.7	0.85	Globular	Brown	-	1	1	1	Lao Loum	<i>Solanum violaceum</i> , No flowers were observed
85	Pale Green	14.3	1.04	Globular	Brown	White	0	1	0	Lao Loum	<i>Solanum torvum</i>
86	Whitish Green	32.5	1.00	Globular	Yellow	White	0	0	0	Lao Loum	
87	Whitish Green	35.6	0.87	Flattened	Yellow	White	1	1	1	Lao Loum	Hard spines
88	Green	9.5	0.96	Globular	Orange	Purple	1	1	1	Lao Therng	<i>Solanum violaceum</i>
89	Pale Green	12.5	1.12	Globular	Brown	White	0	1	0	Lao Therng	<i>Solanum torvum</i> , a little slender
90	Whitish Green	22.9	1.04	Globular	Yellow	-	1	1	1	Lao Therng	No flowers were observed
91	Whitish Green	40.2	0.91	Flattened	Yellow	-	0	0	0	Lao Therng	No flowers were observed
92	-	29.0	1.37	Ovoid	Yellow	-	0	0	0	Lao Therng	Only mature fruits
93	Greenish Purple	29.6	0.99	Globular	-	Purple	0	0	0	Lao Therng	Seeds were given by farmers
94	Whitish Green	30.1	0.98	Globular	Yellow	White	0	0	0	Lao Therng	
95	Whitish Green	37.9	0.75	Flattened	Yellow	White	0	0	0	Phou Thai	
96	Whitish Green	33.0	1.06	Globular	Yellow	White	0	0	0	Phou Thai	
97	-	40.9	1.43	Ovoid	Yellow	-	0	0	0	Makong	Only mature fruits
98	Whitish Green	40.7	1.45	Ellipsoid	Yellow	Purple	0	0	0	Makong	
99	Whitish Green	42.7	1.05	Ovoid	Yellow	Purple	0	0	0	Makong	
100	-	30.7	1.36	Ovoid	Yellow	Purple	0	0	0	Makong	No young fruits were observed
101	-	35.8	1.29	Ovoid	Yellow	-	0	0	0	Makong	Only mature fruits
102	Pale Green	12.4	0.95	Globular	Brown	White	0	1	0	Makong	<i>Solanum torvum</i>
103	Whitish Green	41.0	1.08	Pear shaped	Yellow	Purple	0	0	0	Makong	
104	Whitish Green	26.3	1.09	Globular	Yellow	Purple	0	0	0	Makong	
105	Whitish Green	34.7	0.80	Flattened	Yellow	Purple	0	0	0	Makong	
106	Green	8.9	0.93	Globular	Orange	Purple	1	1	1	Makong	<i>Solanum violaceum</i>
107	Pale Green	13.1	0.99	Globular	Brown	White	0	1	1	Makong	<i>Solanum torvum</i>
108	Whitish Green	51.8	0.75	Flattened	Yellow	Purple	0	0	0	Makong	
109	Whitish Green	31.1	0.95	Globular	Yellow	-	0	0	0	Lao Loum	No flowers were observed
110	Whitish Green	45.2	1.15	Ovoid	Yellow	-	0	0	0	Lao Loum	No flowers were observed
111	Whitish Green	-	-	Flattened	-	Purple	0	0	0	Makong	Partially tinged with purple on skin
112	Whitish Green	28.9	1.15	Ovoid	Yellow	Purple	0	0	0	Makong	
113	Whitish Green	28.1	0.97	Globular	Yellow	Purple	1	1	1	Makong	Hard spines
114	-	27.7	1.07	Globular	Yellow	-	0	0	0	Makong	Only mature fruits
115	-	29.9	0.90	Flattened	Yellow	Purple	0	0	0	Makong	No young fruits were observed
116	Green	8.5	0.91	Globular	Orange	Purple	1	1	1	Lao Loum	<i>Solanum violaceum</i>
117	Whitish Green	32.0	1.13	Ovoid	Yellow	Purple	0	0	0	Lao Loum	
118	White	43.9	1.35	Ovoid	Yellow	-	0	0	0	Lao Loum	No flowers were observed
119	Pale Green	12.9	1.02	Globular	Brown	White	0	1	0	Lao Loum	<i>Solanum torvum</i>
120	Whitish Green	31.3	0.95	Flattened	Yellow	Purple	1	1	1	Lao Loum	Hard spines

Table 3. (Continued).

Collection No.	Harvested fruit (immature fruit)				Skin color of mature fruit	Color of flower	Spiny (1) or spineless (0)			Collected from (tribes)	Remarks
	Skin color	Length (mm)	Length/Diameter	Shape			Calyx	Stem	Leaf		
121	Pale Green	13.5	1.01	Globular	Brown	White	0	1	0	Bor	<i>Solanum torvum</i>
122	Whitish Green	30.8	0.95	Globular	Yellow	Purple	1	1	1	Makong	
123	Green	8.6	1.02	Globular	Orange	Purple	0	1	1	Bor	<i>Solanum violaceum</i>
124	Green	12.5	1.02	Globular	Brown	White	0	1	0	Bor	<i>Solanum torvum</i>
125	Pale Green	9.5	1.02	Globular	Orange	Purple	0	0	0	Bor	<i>Solanum violaceum</i>
126	Whitish Green	27.1	1.29	Ovoid	Yellow	Purple	0	0	0	Bor	
127	Pale Green	13.2	1.06	Globular	Brown	White	0	1	0	Bor	<i>Solanum torvum</i>
128	Whitish Green	28.4	0.98	Globular	Yellow	-	1	1	1	Lao Loum	No flowers were observed
129	Whitish Green	34.6	1.02	Globular	Yellow	-	1	1	1	Lao Loum	No flowers were observed
130	Whitish Green	54.4	1.90	Ellipsoid	Yellow	Purple	0	0	0	Lao Loum	
131	Whitish Green	36.0	1.04	Globular	Yellow	-	0	0	0	Lao Loum	No flowers were observed
132	White	31.8	1.61	Ellipsoid	Yellow	-	-	-	-	Lao Loum	No flowers were observed
133	Purple	19.2	0.96	Globular	-	Purple	0	0	0	Lao Loum	Seeds were given by farmers
134	Pale purple	58.5	1.90	Ellipsoid	-	Purple	0	0	0	Lao Loum	Seeds were given by farmers
135	Whitish Green	29.5	0.95	Globular	Yellow	-	1	-	-	Lao Loum	No flowers were observed

Table 4. The list of *Solanum* genetic resources collected

Coll. No.	JP No.	Passport No.	JP Name	Date	Genus and species	Province / State	District	Village	North latitude	East longitude	Elevation (m)	Source	Status	Local name
1	268347	30075770	COL/LAOS/2018/NIVFS/001	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Handonkoun	18.33.24.37	103.44.17.71	165	backyard	landrace	Mark keua khom
2	268348	30075771	COL/LAOS/2018/NIVFS/002	8-Nov.	<i>S. torvum</i>	Bolikhamsay	Bolikhhan	Handonkoun	18.33.24.37	103.44.14.76	165	backyard	landrace	Mark khaeng
3	268349	30075772	COL/LAOS/2018/NIVFS/003	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Handonkoun	18.33.23.80	103.44.19.80	164	backyard	landrace	Mark keua khom
4	268350	30075773	COL/LAOS/2018/NIVFS/004	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Handonkoun	18.33.23.80	103.44.19.80	164	backyard	landrace	Mark keua
5	268351	30075774	COL/LAOS/2018/NIVFS/005	8-Nov.	<i>S. violaceum</i>	Bolikhamsay	Bolikhhan	Handonkoun	18.33.28.13	103.44.22.02	170	backyard	landrace	Mark khaeng khom
6	268352	30075775	COL/LAOS/2018/NIVFS/006	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Handonkoun	18.33.29.40	103.44.26.57	163	backyard	landrace	Mar keua phory
7	268353	30075776	COL/LAOS/2018/NIVFS/007	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Noug porng	18.10.42.37	104.57.34.97	525	village market	landrace	-
8	268354	30075777	COL/LAOS/2018/NIVFS/008	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Noug porng	18.10.42.37	104.57.34.97	525	village market	landrace	-
9	268355	30075778	COL/LAOS/2018/NIVFS/009	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Noug porng	18.10.42.37	104.57.34.97	525	village market	landrace	-
10	268356	30075779	COL/LAOS/2018/NIVFS/010	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Noug porng	18.10.42.37	104.57.34.97	525	village market	landrace	-
11	268357	30075780	COL/LAOS/2018/NIVFS/011	8-Nov.	<i>S. melongena</i>	Bolikhamsay	Bolikhhan	Noug porng	18.10.42.37	104.57.34.97	525	village market	landrace	-
12	268358	30075781	COL/LAOS/2018/NIVFS/012	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.41.32	104.59.17.29	509	backyard	landrace	Mark keua
13	268359	30075782	COL/LAOS/2018/NIVFS/013	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.41.32	104.59.17.29	509	backyard	landrace	Mark keua
14	268360	30075783	COL/LAOS/2018/NIVFS/014	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.41.32	104.59.17.29	509	backyard	landrace	Mark keua
15	268361	30075784	COL/LAOS/2018/NIVFS/015	9-Nov.	<i>S. torvum</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.40.14	104.59.22.88	509	backyard	landrace	Mark khaeng
16	268362	30075785	COL/LAOS/2018/NIVFS/016	9-Nov.	<i>S. violaceum</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.37.40	104.59.29.85	521	backyard	landrace	Mark khaeng
17	268363	30075786	COL/LAOS/2018/NIVFS/017	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.37.40	104.59.29.85	521	backyard	landrace	Mark keua
18	268364	30075787	COL/LAOS/2018/NIVFS/018	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.32.21	104.59.39.36	515	backyard	landrace	Mark keua
19	268365	30075788	COL/LAOS/2018/NIVFS/019	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Narm phao	18.10.22.41	104.59.45.84	514	backyard	landrace	Mark keua
20	268366	30075789	COL/LAOS/2018/NIVFS/020	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Phon Sy	18.04.42.96	105.02.40.05	506	backyard	landrace	Mark keua khen
21	268367	30075790	COL/LAOS/2018/NIVFS/021	9-Nov.	<i>S. violaceum</i>	Bolikhamsay	Khamkeut	Phon Sy	18.04.42.96	105.02.40.05	506	backyard	landrace	Mark khaeng khom
22	268368	30075791	COL/LAOS/2018/NIVFS/022	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Phon Sy	18.04.42.96	105.02.40.05	506	backyard	landrace	Mark keua
23	268369	30075792	COL/LAOS/2018/NIVFS/023	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Phon Sy	18.04.42.96	105.02.40.05	506	backyard	landrace	Mark keua
24	268370	30075793	COL/LAOS/2018/NIVFS/024	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Phon Sy	18.04.42.96	105.02.40.05	506	backyard	landrace	Mark keua
25	268371	30075794	COL/LAOS/2018/NIVFS/025	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Nong Maix	18.04.42.23	105.04.06.83	509	backyard	landrace	Mark keua
26	268372	30075795	COL/LAOS/2018/NIVFS/026	9-Nov.	<i>S. melongena</i>	Bolikhamsay	Khamkeut	Lark Sep	18.15.09.54	105.01.27.12	521	backyard	landrace	Mark keua
27	268373	30075796	COL/LAOS/2018/NIVFS/027	9-Nov.	<i>S. violaceum</i>	Bolikhamsay	Khamkeut	Lark Sep	18.15.09.54	105.01.27.12	521	backyard	landrace	Mark khaeng khom
28	268374	30075797	COL/LAOS/2018/NIVFS/028	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.32.08.65	104.29.10.00	368	backyard	landrace	Si Leu Lree
29	268375	30075798	COL/LAOS/2018/NIVFS/029	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.32.08.65	104.29.10.00	368	backyard	landrace	Si Leu Lree
30	268376	30075799	COL/LAOS/2018/NIVFS/030	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.32.08.65	104.29.10.00	368	backyard	landrace	Si Leu Lree
31	268377	30075800	COL/LAOS/2018/NIVFS/031	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.32.08.65	104.29.10.00	368	backyard	landrace	Si Leu Lree
32	268378	30075801	COL/LAOS/2018/NIVFS/032	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua puo
33	268379	30075802	COL/LAOS/2018/NIVFS/033	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Si Leu Lree
34	268380	30075803	COL/LAOS/2018/NIVFS/034	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
35	268381	30075804	COL/LAOS/2018/NIVFS/035	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
36	268382	30075805	COL/LAOS/2018/NIVFS/036	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
37	268383	30075806	COL/LAOS/2018/NIVFS/037	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
38	268384	30075807	COL/LAOS/2018/NIVFS/038	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
39	268385	30075808	COL/LAOS/2018/NIVFS/039	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
40	268386	30075809	COL/LAOS/2018/NIVFS/040	10-Nov.	<i>S. aethiopicum</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
41	268387	30075810	COL/LAOS/2018/NIVFS/041	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Si Leu Lree

Table 4. (Continued).

Coll. No.	JP No.	Passport No.	JP Name	Date	Genus and species	Province / State	District	Village	North latitude	East longitude	Elevation (m)	Source	Status	Local name
42	268388	30075811	COL/LAOS/2018/NIVFS/042	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Si Leu Lree
43	268389	30075812	COL/LAOS/2018/NIVFS/043	10-Nov.	<i>S. aethiopicum</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Si Leu Lree
44	268390	30075813	COL/LAOS/2018/NIVFS/044	10-Nov.	<i>S. melongena</i>	Bolikhamsay	Viengthong	Vung Hin	18.33.32.91	104.28.37.74	487	farmland	landrace	Mark keua
45	268391	30075814	COL/LAOS/2018/NIVFS/045	10-Nov.	<i>Solanum sp.</i>	Bolikhamsay	Viengthong	Phondou	18.34.18.35	104.24.01.69	320	farmland	landrace	Mark keua Nam
46	268392	30075815	COL/LAOS/2018/NIVFS/046	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Vieng Khome	18.05.56.84	104.17.20.93	164	backyard	landrace	Mark keua
47	268393	30075816	COL/LAOS/2018/NIVFS/047	11-Nov.	<i>S. violaceum</i>	Bolikhamsay	Pakkading	Vieng Khome	18.05.56.84	104.17.20.93	164	backyard	landrace	Mark khaeng koem
48	268394	30075817	COL/LAOS/2018/NIVFS/048	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Na Hin	18.14.35.76	104.12.49.26	154	backyard	landrace	Mark keua
49	268395	30075818	COL/LAOS/2018/NIVFS/049	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Na Hin	18.14.35.76	104.12.49.26	154	backyard	landrace	Mark keua
50	268396	30075819	COL/LAOS/2018/NIVFS/050	11-Nov.	<i>S. violaceum</i>	Bolikhamsay	Pakkading	Na Hin	18.14.35.76	104.12.49.26	154	backyard	landrace	Mark khaeng khom
51	268397	30075820	COL/LAOS/2018/NIVFS/051	11-Nov.	<i>S. torvum</i>	Bolikhamsay	Pakkading	Na Kheua Ni	18.13.54.26	104.12.21.03	163	backyard	landrace	Mark khaeng
52	268398	30075821	COL/LAOS/2018/NIVFS/052	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Na Kheua Ni	18.13.54.26	104.12.21.03	163	others	landrace	-
53	268399	30075822	COL/LAOS/2018/NIVFS/053	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Na Kheua Nork	18.13.25.09	104.12.03.06	150	backyard	landrace	Mark keua
54	268400	30075823	COL/LAOS/2018/NIVFS/054	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Nam deua	18.14.01.40	104.11.22.05	151	backyard	landrace	Mark keua
55	268401	30075824	COL/LAOS/2018/NIVFS/055	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Nam deua	18.14.08.69	104.11.21.75	151	backyard	landrace	Mark keua
56	268402	30075825	COL/LAOS/2018/NIVFS/056	11-Nov.	<i>S. torvum</i>	Bolikhamsay	Pakkading	Nam deua	18.14.08.69	104.11.21.75	151	backyard	landrace	Mark khaeng
57	268403	30075826	COL/LAOS/2018/NIVFS/057	11-Nov.	<i>S. violaceum</i>	Bolikhamsay	Pakkading	Nam deua	18.14.08.69	104.11.21.75	151	backyard	landrace	Mark kaeng khom
58	268404	30075827	COL/LAOS/2018/NIVFS/058	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Nam deua	18.14.08.69	104.11.21.75	151	backyard	landrace	Mark keua
59	268405	30075828	COL/LAOS/2018/NIVFS/059	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Nam deua	18.14.08.69	104.11.21.75	151	backyard	landrace	Mark keua
60	268406	30075829	COL/LAOS/2018/NIVFS/060	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Nam deua	18.14.08.69	104.11.21.75	151	backyard	landrace	Mark keua kao
61	268407	30075830	COL/LAOS/2018/NIVFS/061	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Na keua noy	18.13.20.36	104.11.59.46	154	backyard	landrace	Mark keua noy
62	268408	30075831	COL/LAOS/2018/NIVFS/062	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Na keua noy	18.13.20.36	104.11.59.46	154	backyard	landrace	Mark keua noy
63	268409	30075832	COL/LAOS/2018/NIVFS/063	11-Nov.	<i>S. melongena</i>	Bolikhamsay	Pakkading	Had Say Khome	18.17.38.04	104.02.44.20	155	backyard	landrace	Mark keua noy
64	268410	30075833	COL/LAOS/2018/NIVFS/064	12-Nov.	<i>S. melongena</i>	Khammouane	Thakhek	Lao Pou Khome	17.22.19.70	104.48.44.27	128	backyard	landrace	Mark keua kerin
65	268411	30075834	COL/LAOS/2018/NIVFS/065	12-Nov.	<i>S. melongena</i>	Khammouane	Thakhek	Muang Sum	17.20.08.66	104.48.39.57	145	backyard	landrace	Mark keua noy
66	268412	30075835	COL/LAOS/2018/NIVFS/066	12-Nov.	<i>S. melongena</i>	Khammouane	Thakhek	Muang Sum	17.20.11.16	104.48.43.17	143	backyard	landrace	Mark keua
67	268413	30075836	COL/LAOS/2018/NIVFS/067	12-Nov.	<i>S. melongena</i>	Khammouane	Thakhek	Muang Sum	17.20.11.16	104.48.43.17	143	backyard	landrace	Mark keua
68	268414	30075837	COL/LAOS/2018/NIVFS/068	12-Nov.	<i>S. melongena</i>	Khammouane	Thakhek	Muang Sum	17.20.11.16	104.48.43.17	143	backyard	landrace	Mark keua yim
69	268415	30075838	COL/LAOS/2018/NIVFS/069	12-Nov.	<i>S. torvum</i>	Khammouane	Thakhek	Muang Sum	17.20.11.16	104.48.43.17	143	backyard	landrace	Mark kaeng
70	268416	30075839	COL/LAOS/2018/NIVFS/070	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Dome kiew neua	17.02.14.09	104.45.16.66	146	backyard	landrace	Mark kheua
71	268417	30075840	COL/LAOS/2018/NIVFS/071	13-Nov.	<i>S. violaceum</i>	Khammouane	Nongbok	Dome kiew neua	17.01.43.02	104.45.04.04	139	backyard	landrace	Mark kaeng khom
72	268418	30075841	COL/LAOS/2018/NIVFS/072	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Dome kiew neua	17.01.43.59	104.45.04.59	140	backyard	landrace	Mark keua
73	268419	30075842	COL/LAOS/2018/NIVFS/073	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Dong khuang	17.06.03.94	104.47.37.97	155	backyard	landrace	Mark keua
74	268420	30075843	COL/LAOS/2018/NIVFS/074	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Song Mung Tai	17.09.04.91	104.48.45.79	148	backyard	landrace	Mark keua
75	268421	30075844	COL/LAOS/2018/NIVFS/075	13-Nov.	<i>S. torvum</i>	Khammouane	Nongbok	Song Mung Tai	17.09.04.91	104.48.45.79	148	backyard	landrace	Mark khang
76	268422	30075845	COL/LAOS/2018/NIVFS/076	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Koud gup	17.09.56.82	104.49.04.14	150	backyard	landrace	Mark keua
77	268423	30075846	COL/LAOS/2018/NIVFS/077	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Koud gup	17.09.56.82	104.49.04.14	150	backyard	landrace	Mark keua
78	268424	30075847	COL/LAOS/2018/NIVFS/078	13-Nov.	<i>S. melongena</i>	Khammouane	Nongbok	Koud gup	17.09.56.82	104.49.04.14	150	backyard	landrace	-
79	268425	30075848	COL/LAOS/2018/NIVFS/079	13-Nov.	<i>S. melongena</i>	Khammouane	Xebangfai	Beung Hou Na Tai	17.08.06.57	104.58.59.86	153	backyard	landrace	Mark keua
80	268426	30075849	COL/LAOS/2018/NIVFS/080	13-Nov.	<i>S. violaceum</i>	Khammouane	Xebangfai	Beung Hou Na Tai	17.08.06.57	104.58.59.86	153	backyard	landrace	Mark kaeng khom
81	268427	30075850	COL/LAOS/2018/NIVFS/081	13-Nov.	<i>S. melongena</i>	Khammouane	Xebangfai	Beung Hou Na Tai	17.08.06.57	104.58.59.86	153	backyard	landrace	Mark keua
82	268428	30075851	COL/LAOS/2018/NIVFS/082	13-Nov.	<i>S. melongena</i>	Khammouane	Xebangfai	Beung Hou Na Neua	17.08.28.99	104.58.59.40	152	backyard	landrace	Mark keua

Table 4. (Continued).

Coll. No.	JP No.	Passport No.	JP Name	Date	Genus and species	Province / State	District	Village	North latitude	East longitude	Elevation (m)	Source	Status	Local name
83	268429	30075852	COL/LAOS/2018/NIVFS/083	14-Nov.	<i>S. violaceum</i>	Khammouane	Nhommalath	Yommalaru Neua	17.36.35.11	105.10.26.48	167	backyard	landrace	Mark khaeng khom
84	268430	30075853	COL/LAOS/2018/NIVFS/084	14-Nov.	<i>S. violaceum</i>	Khammouane	Nhommalath	Yommalaru Neua	17.36.35.11	105.10.26.48	167	backyard	landrace	Mark khaeng khom
85	268431	30075854	COL/LAOS/2018/NIVFS/085	14-Nov.	<i>S. torvum</i>	Khammouane	Nhommalath	Yommalaru Neua	17.36.35.11	105.10.26.48	167	backyard	landrace	Mark khaeng
86	268432	30075855	COL/LAOS/2018/NIVFS/086	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Na poo	17.34.17.54	105.13.21.64	160	backyard	landrace	Mark keua
87	268433	30075856	COL/LAOS/2018/NIVFS/087	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Pom khome	17.33.51.20	105.11.16.59	161	backyard	landrace	Mark keua
88	268434	30075857	COL/LAOS/2018/NIVFS/088	14-Nov.	<i>S. violaceum</i>	Khammouane	Nhommalath	Sarng keo	17.38.45.40	105.10.09.95	168	backyard	landrace	Mark khaeng khom
89	268435	30075858	COL/LAOS/2018/NIVFS/089	14-Nov.	<i>S. torvum</i>	Khammouane	Nhommalath	Sarng keo	17.38.45.40	105.10.09.95	168	backyard	landrace	Mark khaeng
90	268436	30075859	COL/LAOS/2018/NIVFS/090	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Sarng keo	17.38.45.40	105.10.09.95	168	backyard	landrace	Mark keua
91	268437	30075860	COL/LAOS/2018/NIVFS/091	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Sarng keo	17.38.45.40	105.10.09.95	168	backyard	landrace	Mark keua
92	268438	30075861	COL/LAOS/2018/NIVFS/092	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Sarng keo	17.38.45.40	105.10.09.95	168	backyard	landrace	Mark keua
93	268439	30075862	COL/LAOS/2018/NIVFS/093	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Sarng keo	17.38.36.61	105.10.10.13	174	backyard	landrace	Mark keua
94	268440	30075863	COL/LAOS/2018/NIVFS/094	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Thard kor bong	17.37.29.93	105.10.40.32	164	backyard	landrace	Mark keua
95	268441	30075864	COL/LAOS/2018/NIVFS/095	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Noung ping	17.35.52.92	105.11.10.50	162	backyard	landrace	Mark keua
96	268442	30075865	COL/LAOS/2018/NIVFS/096	14-Nov.	<i>S. melongena</i>	Khammouane	Nhommalath	Noung ping	17.35.52.92	105.11.10.50	162	backyard	landrace	Mark keua
97	268443	30075866	COL/LAOS/2018/NIVFS/097	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua kao
98	268444	30075867	COL/LAOS/2018/NIVFS/098	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua
99	268445	30075868	COL/LAOS/2018/NIVFS/099	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua
100	268446	30075869	COL/LAOS/2018/NIVFS/100	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua
101	268447	30075870	COL/LAOS/2018/NIVFS/101	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua
102	268448	30075871	COL/LAOS/2018/NIVFS/102	15-Nov.	<i>S. torvum</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark kaeng
103	268449	30075872	COL/LAOS/2018/NIVFS/103	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua
104	268450	30075873	COL/LAOS/2018/NIVFS/104	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.20.55	105.06.26.79	176	farmland	landrace	Mark keua
105	268451	30075874	COL/LAOS/2018/NIVFS/105	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Toung	17.27.23.99	105.06.20.07	172	farmland	landrace	Mark keua
106	268452	30075875	COL/LAOS/2018/NIVFS/106	15-Nov.	<i>S. violaceum</i>	Khammouane	Mahaxay	Kuan Kuay	17.27.19.65	105.02.53.22	163	backyard	landrace	Mark khang
107	268453	30075876	COL/LAOS/2018/NIVFS/107	15-Nov.	<i>S. torvum</i>	Khammouane	Mahaxay	Kuan Kuay	17.27.19.65	105.02.53.22	163	backyard	landrace	Mark khang
108	268454	30075877	COL/LAOS/2018/NIVFS/108	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Kuan Kuay	17.27.19.65	105.02.53.22	163	backyard	landrace	Mark keua
109	268455	30075878	COL/LAOS/2018/NIVFS/109	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na doo	17.26.15.35	105.01.31.81	158	backyard	landrace	Mark keua
110	268456	30075879	COL/LAOS/2018/NIVFS/110	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na doo	17.26.15.35	105.01.31.81	158	backyard	landrace	Mark keua
111	268457	30075880	COL/LAOS/2018/NIVFS/111	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Khome	17.27.18.84	105.00.00.94	158	backyard	landrace	Mark keua
112	268458	30075881	COL/LAOS/2018/NIVFS/112	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Khome	17.27.18.84	105.00.00.94	158	backyard	landrace	Mark keua
113	268459	30075882	COL/LAOS/2018/NIVFS/113	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Khome	17.27.27.75	104.59.04.06	163	backyard	landrace	Mark keua
114	268460	30075883	COL/LAOS/2018/NIVFS/114	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Khome	17.27.27.75	104.59.04.06	163	backyard	landrace	Mark keua
115	268461	30075884	COL/LAOS/2018/NIVFS/115	15-Nov.	<i>S. melongena</i>	Khammouane	Mahaxay	Na Khome	17.23.35.61	104.59.26.69	156	backyard	landrace	Mark keua
116	268462	30075885	COL/LAOS/2018/NIVFS/116	16-Nov.	<i>S. violaceum</i>	Khammouane	Nakai	Tha Lung	17.50.30.39	105.03.05.81	544	backyard	landrace	Mark khang khom
117	268463	30075886	COL/LAOS/2018/NIVFS/117	16-Nov.	<i>S. melongena</i>	Khammouane	Nakai	Tha Lung	17.50.25.72	105.03.09.27	554	backyard	landrace	Mark keua
118	268464	30075887	COL/LAOS/2018/NIVFS/118	16-Nov.	<i>S. melongena</i>	Khammouane	Nakai	Tha Lung	17.50.25.72	105.03.09.27	554	backyard	landrace	Mark keua
119	268465	30075888	COL/LAOS/2018/NIVFS/119	16-Nov.	<i>S. torvum</i>	Khammouane	Nakai	Tha Lung	17.50.25.72	105.03.09.27	554	backyard	landrace	Mark khang khom
120	268466	30075889	COL/LAOS/2018/NIVFS/120	16-Nov.	<i>S. melongena</i>	Khammouane	Nakai	Tha Lung	17.50.25.72	105.03.09.27	554	backyard	landrace	Mark keua
121	268467	30075890	COL/LAOS/2018/NIVFS/121	16-Nov.	<i>S. torvum</i>	Khammouane	Nakai	Sok On	17.21.05.94	105.13.14.74	542	backyard	landrace	Mark khang
122	268468	30075891	COL/LAOS/2018/NIVFS/122	16-Nov.	<i>S. melongena</i>	Khammouane	Nakai	Buo Ma	17.42.38.27	105.11.44.00	539	others	landrace	Mark keua
123	268469	30075892	COL/LAOS/2018/NIVFS/123	17-Nov.	<i>S. violaceum</i>	Khammouane	Hinboun	Pank Teuk	17.50.31.60	104.29.54.78	159	backyard	landrace	Mark khung khom

Table 4. (Continued).

Coll. No.	JP No.	Passport No.	JP Name	Date	Genus and species	Province / State	District	Village	North latitude	East longitude	Elevation (m)	Source	Status	Local name
124	268470	30075893	COL/LAOS/2018/NIVFS/124	17-Nov.	<i>S. torvum</i>	Khammouane	Hinboun	Huaydeua	17.52.06.44	104.28.39.32	154	backyard	landrace	Mark khung
125	268471	30075894	COL/LAOS/2018/NIVFS/125	17-Nov.	<i>S. violaceum</i>	Khammouane	Hinboun	Huaydeua	17.52.06.44	104.28.39.32	154	backyard	landrace	Mark khung kom
126	268472	30075895	COL/LAOS/2018/NIVFS/126	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Darn hee	17.48.53.51	104.27.53.50	185	backyard	landrace	Mark keua Nay
127	268473	30075896	COL/LAOS/2018/NIVFS/127	17-Nov.	<i>S. torvum</i>	Khammouane	Hinboun	Phon Sa Eat	17.53.00.30	104.27.17.53	193	backyard	landrace	Mark khang
128	268474	30075897	COL/LAOS/2018/NIVFS/128	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Phon dee	17.56.24.40	104.20.36.63	172	backyard	landrace	Mark keua
129	268475	30075898	COL/LAOS/2018/NIVFS/129	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Phon dee	17.56.24.40	104.20.36.63	172	backyard	landrace	Mark keua
130	268476	30075899	COL/LAOS/2018/NIVFS/130	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Kar Toep	17.59.34.90	104.20.45.64	162	backyard	landrace	Mark keua
131	268477	30075900	COL/LAOS/2018/NIVFS/131	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Kar Toep	17.59.34.90	104.20.45.64	162	backyard	landrace	Mark keua
132	268478	30075901	COL/LAOS/2018/NIVFS/132	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Kar Toep	17.59.34.90	104.20.45.64	162	backyard	landrace	Mark keua Nay
133	268479	30075902	COL/LAOS/2018/NIVFS/133	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Kar Toep	17.59.34.90	104.20.45.64	162	backyard	landrace	Mark keua Nay
134	268480	30075903	COL/LAOS/2018/NIVFS/134	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Kar Toep	17.59.34.90	104.20.45.64	162	backyard	landrace	Mark keua
135	268481	30075904	COL/LAOS/2018/NIVFS/135	17-Nov.	<i>S. melongena</i>	Khammouane	Hinboun	Kar Toep	17.59.34.90	104.20.45.64	162	backyard	landrace	Mark keua



Photo 1. An agricultural field in the mountainous region of the Viengthong district.



Photo 2. A car rented during the main part of the survey.



Photo 3. Fruits of eggplant germplasms at a market in Noug porng village.



Photo 4. *Solanum torvum* growing in a garden in Phon Sy village (No. 21).



Photo 5. Interviewing local people in Lark Sep village.



Photo 6. Discussion with the director of the Horticultural Research Center in Vientiane.



Photo 7. Discussion with the director of the Provincial Agriculture and Forestry Office (PAFO) of the Bolikhamxay province.



Photo 8. Discussion with the director of the district Agriculture and Forestry Office (DAFO) of Bolikhan district.

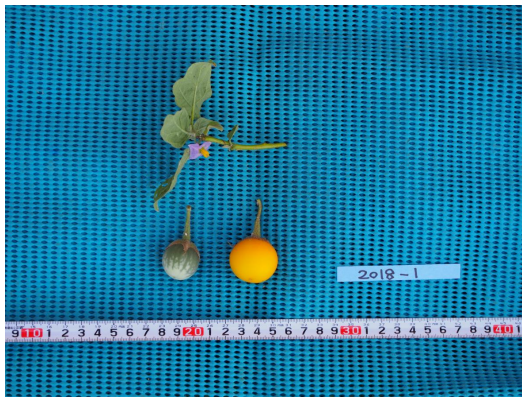


Photo 9. Fruits and other plant organs of the eggplant collected in Handonkoun village (No. 1).



Photo 10. Fruits and other plant organs of *Solanum torvum* collected in Handonkoun village (No. 2).



Photo 11. Fruits and other plant organs of *Solanum aethiopicum* collected in Handonkoun village (No. 5).



Photo 12. Fruits of eggplant collected in Noug porng village (Nos. 7-11).



Photo 13. Eggplant seed bag of imported commercial cultivar from Thailand at Phon Sy village.



Photo 14. A mountainous field with many crops in Vung Hin village.



Photo 15. Fruits and other plant organs of the eggplant collected in the mountainous field in Vung Hin village.



Photo 16. Fruits and other plant organs of *Solanum aethiopicum* (No. 40) collected in the mountainous field in Vung Hin village.



Photo 17. Fruits and other plant organs of *Solanum aethiopicum* (No. 43) collected in the mountainous field in Vung Hin village.

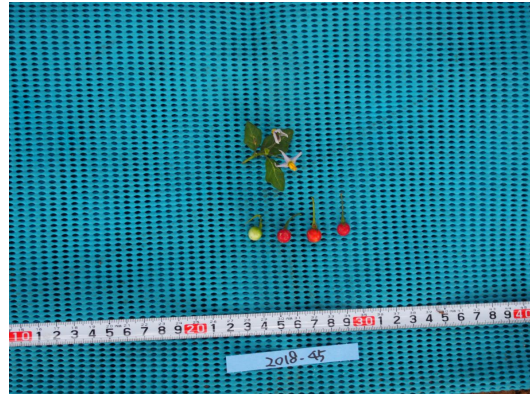


Photo 18. Fruits and other plant organs of *Solanum* sp. (No. 45) collected in the mountainous field in Vung Hin village.



Photo 19. Extracting seeds from rotten fruits at the guesthouse.



Photo 20. A kind of Solanaceous tree observed in Na Hin village.



Photo 21. Discussion with the staff of the PAFO of the Khammouane province.



Photo 22. Heavy spine on calyx, leaf, and stem of sample No. 64 collected in Lao Pou Khome village.



Photo 23. A big fruit of sample No. 68 shared with the farmer in Muang Sum village.



Photo 24. Disease symptoms of powdery mildew observed in Muang Sum village.



Photo 25. Disease symptoms of bacterial wilt observed in Dome kiew neua village.



Photo 26. Collected seeds provided by farmers in Beung Hou Na Neua village.



Photo 27. An integrated farms of many vegetable crops in Beung Hou Na Tai village.



Photo 28. A trace of water level caused by flooding in 2017 in Beung Hou Na Tai village.



Photo 29. Grilled eggplant salad for dinner.



Photo 30. Bacterial streaming observed in water from the wilted plant collected on the banks of the Mekong River.



Photo 31. Discussion with the director of the DAFO of Nhommalath district.



Photo 32. Discussion with the director of the DAFO of Mahaxay district.



Photo 33. A mountainous agronomic field in Na Toung village.



Photo 34. Discussion with the deputy director of the DAFO of Nakai district.



Photo 35. Raw eggplant fruit with boiled sword bean for lunch.



Photo 36. A dam lake for power generation near Phon Sa Eat village.