

Exploration and Collection of Vegetable Genetic Resources in Southern Cambodia, 2021

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Summary

Cambodia is one of the diversity centers of vegetable crops, such as Cucurbitaceae and Solanaceae crops, which could serve as useful genetic resources for breeding programs. Field exploration was conducted in southern Cambodia to collect vegetable genetic resources based on cultivation methods and characteristics. A total of 85 samples from nine crops, including 21 accessions of amaranth, 7 of wax gourd, 34 of melon, 3 of cucumber, 14 of pumpkin, 3 of bottle gourd, and 1 each of watermelon, eggplant, and maize, were collected at 36 sites in five provinces. These samples were collected at new sites, with the exception of one amaranth sample, which was collected from a site where melon samples were previously collected. Their local names, cultivation methods, and the variations in plant and fruit traits were obtained through interviews with farmers or observation of plants and fruits, such as amaranth, wax gourds, melons, and pumpkins, found in a wide geographical area of Cambodia. This information is thought to be a useful reference in the study of Cambodian genetic resources, as well as for the management of collected genetic resources.

KEY WORDS: Diversity, Cucurbitaceae, Eggplant, Amaranth, Maize

Introduction

Until very recently, cereals have been inbred for traits related to yield because of their enriched carbohydrate energy supply. Compared with cereals, vegetables have varied tastes, shapes, and colors in their edible parts, which drive from demands under social

and cultural backgrounds and national characteristics, and their yields are important for sustaining lifestyles. For Cucurbitaceae vegetables, the total production of cucumbers, gherkins, gourds, melons, pumpkins, squash, and watermelons surpassed 249 million tons by 2020, close to the total global production of vegetables (FAO

2022). The current production of Cucurbitaceae crops is dominated by improved varieties. For their cultivation, landraces contribute to improving yield-related traits, quality of edible parts, and resistance traits. In fact, most of the traits resistant to insects and diseases in improved varieties were transferred from Indian landraces to melons (Dhillon *et al.* 2012). However, access to Cucurbitaceae genetic resources from India is difficult in Japan unless a proper agreement for access and benefit-sharing is contracted between the provider under the Nagoya Protocol and the user, or those genetic resources are introduced from a third party, such as the U.S. National Plant Germplasm System, where the largest number of accessions are preserved.

Many countries in South and Southeast Asia have recently considered the importance of conserving their vegetable genetic resources owing to the rapidly increased replacement of landraces by improved varieties. Therefore, in 2014, the Cambodian Agricultural Research and Development Institute (CARDI) signed the Joint Research Agreement (JRA) with the Genetic Resources Center in National Agriculture and Food Research Organization (NGRC), Japan, to explore and collect vegetable genetic resources in Cambodia for further utilization in breeding programs. This JRA has been made under the Plant Genetic Resources in Asia Project (PGRAsia) supported by the Ministry of Agriculture, Forestry and Fisheries of Japan (https://sumire.gene.affrc.go.jp/pgrasia/index_en.php). Since then, numerous exploration and collection activities have been conducted, as reported by Matsunaga *et al.*

(2015, 2018, 2019); Tanaka *et al.* (2016a, 2017, 2019); Tanaka *et al.* (2016b); Okuizumi *et al.* (2017); Sugita *et al.* (2017); Matsushima *et al.* (2018); Yashiro *et al.* (2019); Kondo *et al.* (2019); Kawazu *et al.* (2020), Takeshima *et al.* (2020); Sudasinghe *et al.* (2020); Ouch *et al.* (2021a, 2021b); and Yon *et al.* (2022). A total of over 1,000 samples were collected in those explorations and registered as genetic resources in both institutes, CARDI and NGRC. Of those explorations, three were performed in southern Cambodia (Matsunaga *et al.* 2018; Tanaka *et al.* 2019; Sudasinghe *et al.* 2020). However, there were areas in southern Cambodia where no vegetable genetic resources were collected.

This paper presents the results of exploration and collection activities conducted for Cucurbitaceae genetic resources in the remaining areas of southern Cambodia for 10 days, beginning in early to middle December 2021. Passport data, including the cultivation method and utilization of collected samples, were also recorded.

Methods

An exploration was successfully conducted with an annual specific Letter of Agreement signed by CARDI and NGRC in 2021. This study was conducted in five provinces of southern Cambodia: Svay Rieng, Prey Veng, Kandal, Takeo, and Kampong Speu (Fig. 1), for 10 days, starting from December 6 during the dry season (Table 1). Due to the COVID-19 pandemic, only the CARDI team, composed of researchers, research assistants, and drivers, was able to conduct the exploration.

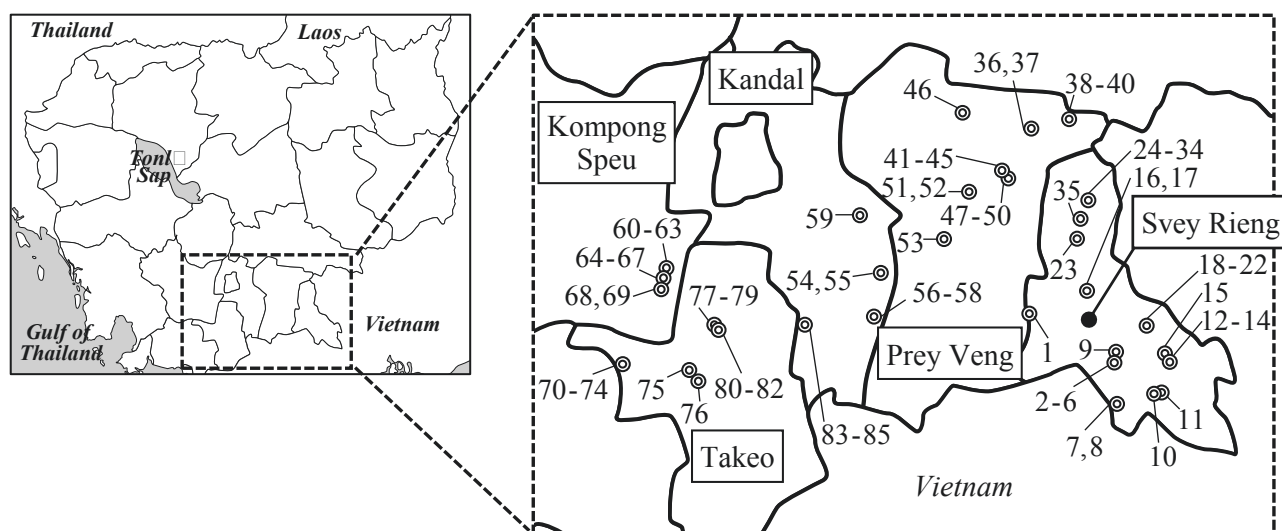


Fig. 1. Map of collection sites in southern Cambodia. Each collection site is indicated by a double circle with a corresponding accession number(s). Collection numbers “2021B-01,” “2021B-02,” “2021B-03,” etc. are abbreviated as “1,” “2,” “3,” etc., respectively.

During the exploration in southern Cambodia, the team met representatives of the Provincial Departments of Agriculture, Forestry and Fisheries and various village leaders where exploration had been performed to collect samples, as indicated in Fig. 1. The exploration included the border area with Vietnam at an altitude ranging from 0 to 68 m above sea level (Table 2). During the survey, we observed a water-abundant area near the Mekong

River and a dry area distant from the Mekong River. Agricultural products had already been harvested in most of the areas that the team visited (Photo 1), but rice and vegetables were still grown in farmers' fields, plastic greenhouses, and small fields near houses where water was supplied by rivers or wells (Photos 2–4). Some crops for medicine and cooking were promptly observed in the backyards (Photos 5 and 6).

Table 1. Itinerary of the exploration and collection of plant genetic resources in southern Cambodia, 2021

| Date (month/day) | Day | Itinerary | Stay |
|---------------------|-----|---|------------|
| 12/6 | Mon | Phnom Penh - Svay Rieng | Svay Rieng |
| 12/7 | Tue | Svay Rieng | Svay Rieng |
| 12/8 | Wed | Svay Rieng - Prey Veng | Prey Veng |
| 12/9 | Thu | Prey Veng | Prey Veng |
| 12/10 | Fri | Prey Veng | Prey Veng |
| 12/11 | Sat | Prey Veng - Phnom Penh | Phnom Penh |
| 12/12 | Sun | Seed preparation | Phnom Penh |
| 12/13 | Mon | Phnom Penh - Takeo - Kampong Speu - Takeo | Takeo |
| 12/14 | Tue | Takeo | Takeo |
| 12/15 | Wed | Takeo - Kandal - Phnom Penh | |



Photo 1. Drying of rice seeds under the sun in Svay Rieng Province.



Photo 3. Melon cultivation with papaya in plastic greenhouse, Takeo Province.



Photo 2. Paddy field in Svay Rieng Province.



Photo 4. Leafy vegetable cultivation on ridge in Prey Veng Province.

We visited farmers' houses, backyards, fields, roadsides, vegetable stands, and public markets by vehicle and on foot (Photos 7–14). Samples were

collected, and the precise positions of the sites were recorded using Garmin ForeTrex 401 (Garmin International Inc., USA). Information, including local



Photo 5. Medicinal plants at backyard in Svay Rieng Province.



Photo 9. Off road leading to farmers' houses, Svay Rieng Province.



Photo 6. Amaranth at backyard in Svay Rieng Province.



Photo 10. Interview with a farmer at a farmers' house in Svay Rieng Province.



Photo 7. Dirt road in lowland, Svay Rieng Province.



Photo 11. Public market, Prey Veng Province.



Photo 8. Narrow road near farmers' houses in Svay Rieng Province.



Photo 12. Vegetable shop at a public market, Svay Rieng Province.

crop names and cultivation methods (e.g., cultivation place, sowing and harvest times, fertilizer application, and fruit usage), was collected by interviewing farmers (Photo 10). Seeds collected from either a single fruit, fruits, or a single plant were registered as one sample. These seeds were preserved in plastic PET bottles, plastic nets, and cloth in farmers' houses, as observed in previous studies (e.g., Tanaka *et al.* 2016a) (Photos 15 and 16). Trait measurements were performed for plants and panicles in amaranth samples and fruits in Cucurbitaceae samples when these samples were found at the sites (Photos 17 and 18).

Results and Discussion

A total of 85 samples were collected from 36 sites. The 85 samples included 21 accessions of amaranth (*Amaranthus* spp.), 7 of wax gourd (*Benincasa hispida* (Thunb.) Cogn.), 34 of melon (*Cucumis melo* L.), 3 of cucumber (*Cucumis sativus* L.), 14 of pumpkin (*Cucurbita moschata* Duchesne ex Poir), 3 of bottle gourd (*Lagenaria siceraria* (Molina) Standl.), and 1 of watermelon (*Citrullus lanatus* (Thunb.) Matsum. & Nakai), eggplant (*Solanum melongena* L.), and maize (*Zea mays* L.) each (Table 2). These 85 samples were collected from markets, farmers' storage facilities,



Photo 13. Vegetables sold at a public market, Prey Veng Province.



Photo 14. Fruit shop at a public market, Svay Rieng Province.



Photo 15. Pumpkin and melon seeds were preserved in plastic pet bottles in Svay Rieng Province (JP286049 and JP286050, respectively).

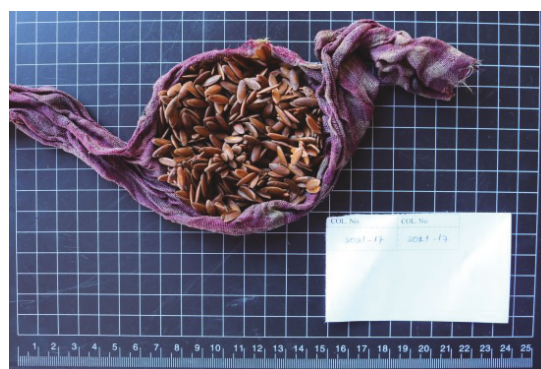


Photo 16. Melon seeds were wrapped in cloth for preservation in Svay Rieng Province (JP286064).



Photo 17. Collection of amaranth seeds in a backyard, Svay Rieng Province (JP286056).



Photo 18. Research on a weedy melon in farmers' fields in Kandal Province (JP286127).

Table 2. Summary of the genetic resources collected in southern Cambodia, 2021

| Date | Province | Altitude (m) | Total | <i>Amaranthus</i> spp. | <i>Benincasa hispida</i> | <i>Cucumis melo</i> | <i>Cucumis sativus</i> | <i>Cucurbita moschata</i> | <i>Lagenaria siceraria</i> | <i>Citrullus lanatus</i> | <i>Solanum melongena</i> | <i>Zea mays</i> |
|-------|----------------------|--------------|-------|------------------------|--------------------------|---------------------|------------------------|---------------------------|----------------------------|--------------------------|--------------------------|-----------------|
| 12/6 | Svay Rieng | 20 – 36 | 6 | 4 | | 1 | | 1 | | | | |
| 12/7 | Svay Rieng | 3 – 12 | 11 | 7 | | 1 | | 3 | | | | |
| 12/8 | Svay Rieng | 7 – 24 | 17 | 5 | 3 | 2 | 2 | 3 | 1 | 1 | | |
| 12/9 | Prey Veng | 12 – 22 | 8 | | | 3 | | 3 | 1 | | 1 | |
| 12/10 | Prey Veng | 17 – 27 | 8 | 2 | 1 | 3 | | | 1 | | | 1 |
| 12/11 | Prey Veng / Kandal | 0 – 11 | 9 | 1 | | 7 | 1 | | | | | |
| 12/13 | Kampong Speu / Takeo | 30 – 68 | 13 | 1 | 2 | 6 | | 4 | | | | |
| 12/14 | Takeo | 7 – 45 | 7 | 1 | 1 | 5 | | | | | | |
| 12/15 | Kandal | 6 – 14 | 6 | | | 6 | | | | | | |
| Total | | | 85 | 21 | 7 | 34 | 3 | 14 | 3 | 1 | 1 | 1 |

backyards, and fields. The team collected one amaranth sample species (JP286101) from the same site, which had been previously explored for three melon samples (JP269622, JP269623, and 269624 in Tanaka *et al.* 2019). Thus, all the samples collected in the present study were new genetic resources for both CARDI and NGRC.

Information, including local crop names and cultivation methods, was collected by interviewing the farmers. Especially for vegetable cultivation, improved varieties introduced from foreign countries, chemical fertilizers, and insecticides were frequently used in southern Cambodia (Photos 19 and 20). The overview of each crop is described in the following paragraphs, except for cucumber, bottle gourd, watermelon, eggplant, and maize, for which only a few samples were collected.

Amaranth

Amaranth samples collected from backyards were grown naturally (Photo 17). They were found in northern, southern, and eastern Cambodia (Kondo *et al.* 2019; Sudasinghe *et al.* 2020; Takeshima *et al.* 2020), and could be conveniently used for prompt cooking. Amaranth was only used as a leafy vegetable, as reported in previous studies (Sudasinghe *et al.* 2020; Takeshima *et al.* 2020; Ouch *et al.* 2021b). Their names were collected from local people at the collection site and were “Kbong Achmoan,” “Kbong Bornla,” “Kbong Doung,” “Pty,” “Pty Achmoan,” “Pty Bornla,” “Pty Bornla Korham,” “Pty Bornla Sor,” and “Pty Doung” (Table 3). “Kbong” and “Pty” means *Amaranthus* in the Khmer language, except for the single term “Pty,” which was used to refer to *Amaranthus viridis* L (Ouch *et al.* 2021b). “Achmarn,” “Bornla,” and “Doung” were recognized in the collected samples of *A. blitum* L., *A. spinosus* L., and *A. viridis*, respectively. All amaranth samples were assigned species names. However, we did not collect information on the key characteristics of bracts, flowers, and grains, as described by Takeshima *et al.* (2020), which are generally used for the classification of amaranth species.



Photo 19. Insecticide to aphids.

Photo 20. F₁ hybrid of cucumber was produced by Trang Nong Seed Co., LTD, Vietnam.

Thus, the assignment of species names to the amaranth samples collected was not successful. Plant height, leaf length and width, panicle length, and color of plants and panicles varied.

Wax gourd

Except for one sample (JP286090), wax gourd samples were collected as seeds that were used for cultivation in the next season (Table 4). An accession named “Trolach” was collected in areas visited, as well as in wide geographical areas of Cambodia, where the names “Tror Lach” and “Tro Laeh,” similarly to “Trolach,” were recorded as wax gourds (Matsunaga *et al.* 2015; Okuizumi *et al.* 2017; Tanaka *et al.* 2017, 2019;

Table 3. Description of amaranth genetic resources collected in southern Cambodia, 2021

| Collection Number | JP Number | Local Name | Plant height (cm) | Plant color without panicle | Leaf length (cm) | Leaf width (cm) | Panicle length (cm) | Panicle color |
|-------------------|-----------|-------------------|-------------------|-----------------------------|------------------|-----------------|---------------------|---------------|
| 2021B1 | 286048 | Pty Doung | 80.0 | Green | | | | Yellow |
| 2021B4 | 286051 | Kbong Achmoan | 8.0 | Purple | 3.0 | 2.2 | 4.5 | Purple |
| 2021B5 | 286052 | Pty Bornla | 90.0 | Red | | | | Yellow |
| 2021B6 | 286053 | Pty Doung | 123.0 | Green | 9.5 | 4.5 | 27.0 | Green |
| 2021B7 | 286054 | Kbong Bornla | 116.0 | Red | 4.3 | 2.3 | 24.0 | Yellow |
| 2021B9 | 286056 | Pty Bornla | 70.0 | Red | 1.5 | 1.0 | 44.0 | Yellow |
| 2021B10 | 286057 | Pty Bornla | 36.5 | Red | 3.5 | 1.5 | 7.0 | Green |
| 2021B11 | 286058 | Pty Achmoan | 34.0 | Red | 2.7 | 2.0 | 6.0 | Red |
| 2021B12 | 286059 | Kbong Doung | 130.0 | Green | 11.1 | 7.7 | 40.0 | Green |
| 2021B13 | 286060 | Kbong Achmoan | 40.0 | Red | 4.0 | 3.0 | 8.2 | Purple |
| 2021B14 | 286061 | Kbong Bornla | 93.0 | Red | 6.0 | 2.5 | 21.0 | Green |
| 2021B19 | 286066 | Kbong Doung | 40.0 – 50.0 | White | | | | |
| 2021B26 | 286073 | Pty Doung | 68.0 | Green | 10.0 | 6.5 | 16.0 | Green |
| 2021B27 | 286074 | Pty Achmoan | 29.0 | Red | 4.0 | 2.5 | 5.0 | Red |
| 2021B28 | 286075 | Pty Bornla Sor | 70.0 | Green | 7.8 | 3.6 | 27.0 | Green |
| 2021B29 | 286076 | Pty Bornla Korham | 48.0 | Red | 5.0 | 2.5 | 20.0 | Red |
| 2021B45 | 286092 | Pty Doung | 90.0 | Green | 12.0 | 7.5 | 25.0 | Green |
| 2021B50 | 286097 | Pty Doung | | Green | | | | |
| 2021B54 | 286101 | Pty | 116.0 | Red | 10.5 | 6.0 | 21.5 | Red |
| 2021B72 | 286119 | Pty Doung | 118.0 | Green | 15.6 | 8.8 | 35.0 | Green |
| 2021B79 | 286126 | Pty Doung | 110.0 | Green | 10.0 | 5.0 | 25.0 | Green |

Kondo *et al.* 2019; Sudasinghe *et al.* 2020). Their fruits were oblong, elongated, or narrow and elongated, based on interviews with the farmers.

Melon

The melon samples were collected as seed and fruit samples from fields and markets (Photos 18, 21, and 22) (Table 4). Previous studies have shown that melons are cultivated in areas where agricultural water is supplied from rivers and lakes during the dry season (Tanaka *et al.* 2016a, 2017, 2019). Thus, trait measurements of melon fruits and plants can be conducted in these areas to analyze their variations.

Melons were also collected from farmers' fields near the Mekong River in the Kandal Province (Photo 23) (Table 4). The melon samples had very small fruits and were not cultivated by farmers, although they consumed the fruits. The melon samples were classified as one of the melon groups, Group Agrestis, based on the explanation by Pitrat (2016), as follows: it grows around the field of farmers as a weed and has very small-sized leaves, fruits, seeds, and sour flesh. Thus, the melon samples were designated as weedy melons. Group Agrestis was also found near the Mekong River in the Kandal and Prey Veng provinces in previous



Photo 21. Melon fruit was sold at a market in Kandal Province (JP286104).



Photo 22. Fresh appearance after cutting by longitudinal section in Kandal Province (JP286104).



Photo 23. Weedy melon at banana plantation, Kandal Province (JP286102).

explorations (Tanaka *et al.* 2017, 2019) or in areas distant from the Mekong River downstream (Matsunaga *et al.* 2015; Tanaka *et al.* 2016a, 2017; Yashiro *et al.* 2019). The Mekong River may thus be an invaluable habitat for weedy melons in Cambodia.

Cultivated melons were called “Trosok Srov,” “Trosok Seang,” and “Trosok Mam,” based on the interview with each farmer who donated samples (Table 4), of which the accession named “Trosok Srov” was collected in wide geographical areas in Cambodia after explorations (Matsunaga *et al.* 2015; Tanaka *et al.* 2016a, 2017, 2019). Their fruits were elongated, elliptical, or oblong without a net on the epicarp and colored green or yellow. These fruit characteristics are often observed in Cambodia, considering the results of previous studies mentioned above.

Pumpkin

The pumpkin samples were collected as seeds from farmers’ houses, except for two accessions from one market (JP286083 and JP286084) (Table 4). Their local name was “Lpov” among all pumpkin samples collected, as well as those from wide geographical areas in Cambodia (e.g., Tanaka *et al.* 2016a, 2017, 2019). The unique name for pumpkin, instead of “Lpov,” was not recognized at sites such as the “Ma eouk,” “Plery,” “Ropeuy,” “Tol,” and “Ya tol” in the Ratanakiri province of northeastern Cambodia (Ouch *et al.* 2021a). Names of some pumpkin samples collected included the additional names, “Kapen Thom Kmao,” “Kapen ouch,” “Kha'am,” “Khloneg,” “Khloneg,” and “Rolong.” The accessions named “Khloneg” and “Khloneg” were also collected in previous explorations of western Cambodia as similar pronounciational names “Krong” and “Kluang,” respectively (Okuizumi *et al.* 2017). This observation between distant areas was also found for the names “Lpov Kingkuk” and “Lpov Tru” in our previous report (Ouch *et al.* 2021b).

All pumpkin samples were classified as *Cucurbita moschata* by pentagonally shaped peduncles in the joint part with the fruit (Table 4). It was clear from interviews with farmers that their fruits were colored yellow, orange, or green on the epicarp. Most of them had a flattened shape, and a few had trapezoidal, round, pear, and elliptical shapes. Shape variation was found in pumpkin samples from northern and southwestern Cambodia (Kondo *et al.* 2019; Yon *et al.* 2022). Fertilizers and pesticides were not used or rarely applied during pumpkin cultivation in the areas visited, and their seeds for the next cultivation were collected by farmers. Pumpkin cultivation has been managed in northeastern, northern, and southwestern Cambodia (Ouch *et al.* 2021a, 2012b; Yon *et al.* 2022).

Conclusion

In conclusion, the genetic resources collected in this exploration were from novel sites in southern Cambodia, except for one amaranth sample, which was collected from the site where melon samples were collected in the previous exploration. We obtained information on the local name, plant and fruit traits, and cultivation methods, which were found in previous explorations of a wide geographical area of Cambodia. This information is a useful reference for the study of Cambodian genetic resources, as well as for the management of genetic resources collected.

Genetic resources

All seeds of the 85 samples collected were stored as genetic resources in the CARDI Genebank and divided into two subsets; a subset was placed in the NARO Genebank with JP numbers under the Standard Material Transfer Agreement of the International Treaty on Plant Genetic Resources for Food and Agriculture. We plan to multiply the genetic resources and evaluate them the following year.

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between NARO and NIAS in April 2016, the National Agriculture and Food Research Organization (NARO) succeeded in fulfilling all the obligations and rights of NIAS under the JRA.

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カンボジア南部における 野菜遺伝資源探索, 2021 年

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和文摘要

カンボジアはウリ科やナス科などの野菜の多様性中心の一つで、同国における野菜遺伝資源はこれらの育種計画において有益な素材として活用できる。そこで、カンボジア南部において野菜類に関する遺伝資源探索を実施し、野菜遺伝資源とともに、それらの栽培方法や特性に関する情報を収集した。本探索では、5州の36地点から85点の野菜遺伝資源を収集した。その内訳は、21点のアマランサス、7点のトゥガン、34点のメロン、3点のキュウリ、14点の日本カボチャ、3点のヒョウタンおよびそれぞれ1点のスイカ、ナスとトウモロコシである。収集した遺伝資源は、1点を除いて、新規の地点から収集したものであり、また、残る1点のアマランサスについても、これまでに、その地点からはアマランサスは収集されていなかった。このことから、これら85点の遺伝資源は過去の探索地との重複無く収集されたものであった。農家からの聞き取りや形質の調査によって得たアマランサス、トゥガン、メロンおよび日本カボチャについての呼称や栽培方法および植物や果実の変異についての情報は、カンボジア東部、西部、南部および北部での探索において得られた情報と同じまたはそれに近いものであった。既報や本調査における4つの作物についての概要や形質についての情報は、カンボジアの遺伝資源に関する研究や本調査で収集した遺伝資源の管理・利用に有益であると考えられる。

Table 4. Genetic resources collected in southern Cambodia in 2021

| Coll. No. | JP No. | CARDI No. | Coll. Date | Crop name | Species | Province | District | Commune | Village | Latitude & Longitude | Altitude (m) | Tribe | Plant status | Collection | | | Local Name | Information obtained from farmers |
|-----------|--------|-----------|------------|------------------|----------------------------|------------|-------------|---------------|-----------------|-----------------------------|--------------|-------|--------------|------------|--------------|------------------|---------------|---|
| | | | | | | | | | | | | | | status | method | source | | |
| 2021B01 | 286048 | 2021-085 | 6-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Svay Chrum | Krol Kor | Thlork | N11-8-28.32 & E105-37-37.92 | 36 | Khmer | Weed | Plant | Single plant | Backyard | Pty Doung | |
| 2021B02 | 286049 | 2021-086 | 6-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Kampong Rou | Preah Ponlea | Angkdouch | N11-00-11.8 & E105-52-40.5 | 20 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov Kha'am | Fruit shape: Trapezoid Fruit skin color: Green |
| 2021B03 | 286050 | 2021-087 | 6-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Svay Rieng | Kampong Rou | Preah Ponlea | Angkdouch | N11-00-11.8 & E105-52-40.5 | 20 | Khmer | Landrace | Seeds | Single plant | Farmer's storage | Trosok Srov | Fruit shape: Elongated |
| 2021B04 | 286051 | 2021-088 | 6-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Kampong Rou | Preah Ponlea | Angkdouch | N11-00-11.8 & E105-52-40.5 | 20 | Khmer | Weed | Plant | Single plant | Backyard | Kbong Achmoan | |
| 2021B05 | 286052 | 2021-089 | 6-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Kampong Rou | Preah Ponlea | Angkdouch | N11-00-11.9 & E105-52-40.6 | 20 | Khmer | Weed | Plant | Single plant | Backyard | Pty Bornla | |
| 2021B06 | 286053 | 2021-090 | 6-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Kampong Rou | Preah Ponlea | Angkdouch | N11-00-11.10 & E105-52-40.7 | 20 | Khmer | Weed | Plant | Single plant | Backyard | Pty Doung | |
| 2021B07 | 286054 | 2021-091 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Kampong Rou | Chrey Thom | Kor Krouh | N10-58-30.3 & E105-51-40.1 | 9 | Khmer | Weed | Plant | Single plant | Backyard | Kbong Bornla | |
| 2021B08 | 286055 | 2021-092 | 7-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Kampong Rou | Chrey Thom | Kor Krouh | N10-58-19.9 & E105-51-32.6 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov | Fruit shape: Round Fruit skin color: Orange |
| 2021B09 | 286056 | 2021-093 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Svay Teab | Brosotr | Angtamok | N11-00-46.2 & E105-53-04.6 | 4 | Khmer | Weed | Plant | Single plant | Backyard | Pty Bornla | |
| 2021B10 | 286057 | 2021-094 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Kampong Rou | Ksetr | Trarpaeng Smach | N10-58-21.2 & E105-56-24.6 | 3 | Khmer | Weed | Plant | Single plant | Backyard | Pty Bornla | |
| 2021B11 | 286058 | 2021-095 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Kampong Rou | Svay Tayean | Phum II | N10-58-21.3 & E105-58-21.3 | 4 | Khmer | Weed | Plant | Single plant | Backyard | Pty Achmoan | |
| 2021B12 | 286059 | 2021-096 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Krong Bavet | Chrork Mtesh | Toul Ampel | N11-02-41.3 & E106-00-15.1 | 10 | Khmer | Weed | Plant | Single plant | Backyard | Kbong Doung | |
| 2021B13 | 286060 | 2021-097 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Krong Bavet | Chrork Mtesh | Toul Ampel | N11-02-41.4 & E106-00-15.2 | 10 | Khmer | Weed | Plant | Single plant | Backyard | Kbong Achmoan | |
| 2021B14 | 286061 | 2021-098 | 7-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Krong Bavet | Chrork Mtesh | Toul Ampel | N11-02-41.5 & E106-00-15.3 | 10 | Khmer | Weed | Plant | Single plant | Backyard | Kbong Bornla | |
| 2021B15 | 286062 | 2021-099 | 7-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Krong Bavet | Chrork Mtesh | Veal | N11-04-25.4 & E106-00-10.6 | 8 | Khmer | Landrace | Seeds | Single plant | Farmer's storage | Lpov | Fruit shape: Flattened Fruit skin color: Orange |
| 2021B16 | 286063 | 2021-100 | 7-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Rumduol | Kampong Ampel | Toul Chres | N11-15-26.0 & E105-47-39.1 | 8 | Khmer | Landrace | Seeds | Single plant | Farmer's storage | Lpov Khlung | Fruit shape: Flattened Fruit skin color: Orange |
| 2021B17 | 286064 | 2021-101 | 7-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Svay Rieng | Rumduol | Kampong Ampel | Toul Chres | N11-15-26.0 & E105-47-39.1 | 8 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B18 | 286065 | 2021-102 | 8-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Rumduol | Bos Mon | Bos Svay | N11-14-10.4 & E105-52-44.0 | 14 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov | Fruit shape: Narrow pear shaped Fruit skin color: Yellow |
| 2021B19 | 286066 | 2021-103 | 8-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Rumduol | Bos Mon | Bos Svay | N11-14-10.4 & E105-52-44.0 | 14 | Khmer | Landrace | Seeds | Single plant | Farmer's storage | Kbong Doung | |
| 2021B20 | 286067 | 2021-104 | 8-Dec-21 | Bottle gourd | <i>Lagenaria siceraria</i> | Svay Rieng | Rumduol | Bos Mon | Bos Svay | N11-14-10.4 & E105-52-44.0 | 14 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Khork | Fruit shape: Elongated with green skin |
| 2021B21 | 286068 | 2021-105 | 8-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Svay Rieng | Rumduol | Bos Mon | Bos Svay | N11-14-09.4 & E105-52-44.8 | 7 | Khmer | Landrace | Seeds | Single fruit | Farmer's storage | Trolach | Fruit shape: Elongated |
| 2021B22 | 286069 | 2021-106 | 8-Dec-21 | Cucumber | <i>Cucumis sativus</i> | Svay Rieng | Rumduol | Bos Mon | Bos Svay | N11-14-09.4 & E105-52-44.8 | 7 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok | Fruit shape: elongated |

Table 4. (Continued).

| Coll. No. | JP No. | CARDI No. | Coll. Date | Crop name | Species | Province | District | Commune | Village | Latitude & Longitude | Altitude (m) | Tribe | Plant status | Collection | | | Local Name | Information obtained from farmers |
|-----------|--------|-----------|------------|------------------|----------------------------|------------|--------------|---------------------|-------------------|----------------------------|--------------|-------|--------------|------------|--------------|------------------|----------------------|---|
| | | | | | | | | | | | | | | status | method | source | | |
| 2021B23 | 286070 | 2021-107 | 8-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Svay Rieng | Romeas Haek | Andong Pou | Trarpeng Banteay | N11-21-23.8 & E105-45-30.5 | 21 | Khmer | Landrace | Fruit | Single fruit | Farmer's Field | Trosok Srov | Fruit shape: Broad elliptic Fruit skin color: Green |
| 2021B24 | 286071 | 2021-108 | 8-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-55.1 & E105-50-11.4 | 24 | Khmer | Landrace | Seeds | Single fruit | Farmer's storage | Lpov Kapen Thom Kmao | Fruit shape: Broad elliptic Fruit skin color: Green |
| 2021B25 | 286072 | 2021-109 | 8-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-55.1 & E105-50-11.4 | 24 | Khmer | Landrace | Seeds | Single fruit | Farmer's storage | Lpov Kapen Touch | Fruit shape: Narrow elliptic Fruit skin color: Green |
| 2021B26 | 286073 | 2021-110 | 8-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-55.1 & E105-50-11.4 | 24 | Khmer | Weed | Plant | Single plant | Backyard | Pty Doung | |
| 2021B27 | 286074 | 2021-111 | 8-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-55.1 & E105-50-11.4 | 24 | Khmer | Weed | Plant | Single plant | Backyard | Pty Achmoan | |
| 2021B28 | 286075 | 2021-112 | 8-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-55.1 & E105-50-11.4 | 24 | Khmer | Weed | Plant | Single plant | Backyard | Pty Bornla Sor | |
| 2021B29 | 286076 | 2021-113 | 8-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-55.1 & E105-50-11.4 | 24 | Khmer | Weed | Plant | Single plant | Backyard | Pty Bornla Korham | |
| 2021B30 | 286077 | 2021-114 | 8-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-37.7 & E105-49-25.3 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Green |
| 2021B31 | 286078 | 2021-115 | 8-Dec-21 | Watermelon | <i>Citrullus lanatus</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-37.7 & E105-49-25.3 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Ovlek | Fruit shape: Round or elongated Fruit weight: 3 kg/fruit |
| 2021B32 | 286079 | 2021-116 | 8-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-37.7 & E105-49-25.3 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trolach Srov | Fruit shape: Narrow elongated |
| 2021B33 | 286080 | 2021-117 | 8-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-37.7 & E105-49-25.3 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trolach | Fruit shape: Elongated |
| 2021B34 | 286081 | 2021-118 | 8-Dec-21 | Cucumber | <i>Cucumis sativus</i> | Svay Rieng | Romeas Haek | Ampel | Sre Ruessay | N11-27-37.7 & E105-49-25.3 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Pa'ork | Fruit shape: Narrow elliptic |
| 2021B35 | 286082 | 2021-119 | 9-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Kamchay Mear | Kra Nhoung | Kamchay Mear | N11-24-44.2 & E105-46-53.2 | 14 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B36 | 286083 | 2021-120 | 9-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Prey Veng | Kamchay Mear | Kra Nhoung | Kamchay Mear | N11-37-09.0 & E105-41-07.7 | 22 | Khmer | Landrace | Fruit | Single fruit | Market | Lpov Khlong | Fruit shape: Flattened Fruit skin color: Yellow |
| 2021B37 | 286084 | 2021-121 | 9-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Prey Veng | Kamchay Mear | Kra Nhoung | Kamchay Mear | N11-37-09.0 & E105-41-07.7 | 22 | Khmer | Landrace | Fruit | Single fruit | Market | Lpov Rolong | Fruit shape: Flattened Fruit skin color: Yellow with spots |
| 2021B38 | 286085 | 2021-122 | 9-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Kamchay Mear | Krabao | Wat Tbong | N11-37-20.5 & E105-45-37.4 | 21 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Oblong Fruit skin color: Yellow |
| 2021B39 | 286086 | 2021-123 | 9-Dec-21 | Eggplant | <i>Solanum melongena</i> | Prey Veng | Kamchay Mear | Krabao | Wat Tbong | N11-37-20.5 & E105-45-37.4 | 21 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trorb Thkheam | Round shape with white skin |
| 2021B40 | 286087 | 2021-124 | 9-Dec-21 | Bottle gourd | <i>Lagenaria siceraria</i> | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Thnong Khang Kert | N11-37-20.6 & E105-45-37.4 | 19 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Khlorok | Fruit shape: elongated with green skin |
| 2021B41 | 286088 | 2021-125 | 9-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Thnong Khang Lech | N11-34-52.4 & E105-36-56.2 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B42 | 286089 | 2021-126 | 9-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Thnong Khang Lech | N11-34-52.4 & E105-36-56.2 | 12 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov Khlong | Fruit shape: Flattened Fruit skin color: Yellow with spots |

Table 4. (Continued).

| Coll. No. | JP No. | CARDI No. | Coll. Date | Crop name | Species | Province | District | Commune | Village | Latitude & Longitude | Altitude (m) | Tribe | Plant status | Collection | | | Local Name | Information obtained from farmers |
|-----------|--------|-----------|------------|------------------|----------------------------|--------------|--------------|---------------------|-------------------|----------------------------|--------------|-------|--------------|------------|--------------|------------------|---------------|--|
| | | | | | | | | | | | | | | status | method | source | | |
| 2021B43 | 286090 | 2021-127 | 10-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Prey Veng | Kanhchriech | Kdeung Reay | Samroung | N11-34-46.9 & E105-36-33.8 | 19 | Khmer | Landrace | Fruit | Single fruit | Farmer's storage | Trolach | Fruit shape: Narrow elongated |
| 2021B44 | 286091 | 2021-128 | 10-Dec-21 | Bottle gourd | <i>Lagenaria siceraria</i> | Prey Veng | Kanhchriech | Kdeung Reay | Samroung | N11-34-46.9 & E105-36-33.8 | 19 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Khlorok | Fruit shape: Elongated |
| 2021B45 | 286092 | 2021-129 | 10-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Prey Veng | Kanhchriech | Kdeung Reay | Samroung | N11-34-46.9 & E105-36-33.8 | 19 | Khmer | Weed | Plant | Single plant | Backyard | Pty Doung | |
| 2021B46 | 286093 | 2021-130 | 10-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Prey Veng | Kampong Leav | Phum Bie | N11-41-42.6 & E105-27-03.2 | 17 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B47 | 286094 | 2021-131 | 10-Dec-21 | Maize | <i>Zea mize</i> | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Thnong Khang Kert | N11-34-00.5 & E105-37-04.5 | 27 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Pout Damnoub | |
| 2021B48 | 286095 | 2021-132 | 10-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Prey Stour | N11-33.14.2 & E105-37-41.8 | 24 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated with ribs Fruit skin color: Yellow |
| 2021B49 | 286096 | 2021-133 | 10-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Prey Stour | N11-33.14.2 & E105-37-41.8 | 24 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: White |
| 2021B50 | 286097 | 2021-134 | 10-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Prey Veng | Kamchay Mear | Smoang Khang Cheung | Prey Stour | N11-33.14.2 & E105-37-41.8 | 24 | Khmer | Landrace | Seeds | Single plant | Farmer's storage | Pty Doung | |
| 2021B51 | 286098 | 2021-135 | 11-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Svay Ontor | Chrey | Me Norng | N11-31-28.9 & E105-31-54.8 | 5 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B52 | 286099 | 2021-136 | 11-Dec-21 | Cucumber | <i>Cucumis sativus</i> | Prey Veng | Svay Ontor | Chrey | Me Norng | N11-31-28.9 & E105-31-54.8 | 5 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Treung | Fruit shape: Narrow elliptic Fruit skin color: Dark green |
| 2021B53 | 286100 | 2021-137 | 11-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Prey Veng | Svay Ontor | Teuk Thla | Troak Tapang | N11-21-36.8 & E105-26-15.5 | 3 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B54 | 286101 | 2021-138 | 11-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Kandal | Leuk Daek | Praek Tonlob | Spean Daek | N11-15-57.7 & E105-15-59.2 | 6 | Khmer | Weed | Plant | Single plant | Roadside | Pty | |
| 2021B55 | 286102 | 2021-139 | 11-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | Leuk Daek | Praek Tonlob | Phum Pei | N11-15-58.1 & E105-15-58.5 | 11 | Khmer | Weed | Fruit | Single plant | Farmer's Field | Trosok Sva | Fruit shape: Oblong Fruit skin color: Green |
| 2021B56 | 286103 | 2021-140 | 11-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | Leuk Daek | Praek Dach | Ta Heng | N11-09-41.3 & E105-13-30.6 | 0 | Khmer | Weed | Fruit | Single plant | Farmer's Field | Trosok Sva | Fruit shape: Oblong Fruit skin color: Green |
| 2021B57 | 286104 | 2021-141 | 11-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kandal | Kien Svay | Samroang Thom | Chroy Dorg | N11-09-41.3 & E105-13-30.6 | 1 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B58 | 286105 | 2021-142 | 11-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kandal | Kien Svay | Samroang Thom | Chroy Dorg | N11-09-41.3 & E105-13-30.6 | 1 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B59 | 286106 | 2021-143 | 11-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kandal | Kien Svay | Samroang Thom | Praek Kakav | N11-26-18.4 & E105-11-28.1 | 3 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Seang | Fruit shape: Elongated Fruit skin color: Green |
| 2021B60 | 286107 | 2021-144 | 13-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kampong Speu | Kong Pisei | Moha Ruessei | Krang Sboav | N11-15-20.4 & E104-40-36.7 | 37 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B61 | 286108 | 2021-145 | 13-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Kampong Speu | Kong Pisei | Moha Ruessei | Krang Sboav | N11-15-20.4 & E104-40-36.7 | 37 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov | Fruit shape: Flattened Fruit skin color: Yellow |
| 2021B62 | 286109 | 2021-146 | 13-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Kampong Speu | Kong Pisei | Moha Ruessei | Krang Sboav | N11-15-20.4 & E104-40-36.7 | 37 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trolach | Fruit shape: Elongated |

Table 4. (Continued).

| Coll. No. | JP No. | CARDI No. | Coll. Date | Crop name | Species | Province | District | Commune | Village | Latitude & Longitude | Altitude (m) | Tribe | Plant status | Collection | | | Local Name | Information obtained from farmers |
|-----------|--------|-----------|------------|------------------|---------------------------|--------------|-----------------|----------------------------|------------------|----------------------------|--------------|-------|--------------|------------|--------------|------------------|-------------|--|
| | | | | | | | | | | | | | | status | method | source | | |
| 2021B63 | 286110 | 2021-147 | 13-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kampong Speu | Kong Pisei | Moha Ruessei | Krang Sboav | N11-15-20.0 & E104-40-35.3 | 41 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B64 | 286111 | 2021-148 | 13-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kampong Speu | Kong Pisei | Prey Vihear | Chamkar Doung | N11-13-33.5 & E104-40-06.9 | 30 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B65 | 286112 | 2021-149 | 13-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Kampong Speu | Kong Pisei | Prey Vihear | Chamkar Doung | N11-13-33.5 & E104-40-06.9 | 30 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov | Fruit shape: Flattened Fruit skin color: Yellow |
| 2021B66 | 286113 | 2021-150 | 13-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Kampong Speu | Kong Pisei | Prey Vihear | Chamkar Doung | N11-13-33.5 & E104-40-06.9 | 30 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trolach | Fruit shape: Elongated |
| 2021B67 | 286114 | 2021-151 | 13-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Kampong Speu | Kong Pisei | Prey Vihear | Chamkar Doung | N11-13-33.5 & E104-40-06.9 | 30 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Mam | Fruit shape: Elongated Fruit skin color: Green |
| 2021B68 | 286115 | 2021-152 | 13-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Tram Kak | Our Saray | Trarpang Kralanh | N11-12-35.0 & E104-39-44.0 | 33 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B69 | 286116 | 2021-153 | 13-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Takeo | Tram Kak | Our Saray | Trarpang Kralanh | N11-12-35.0 & E104-39-44.0 | 33 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov | Fruit shape: Flattened Fruit skin color: Yellow |
| 2021B70 | 286117 | 2021-154 | 13-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Tram Kak | Trapeang Thom Khang Tboung | Prey Preal | N11-01-57.6 & E104-32-19.4 | 68 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B71 | 286118 | 2021-155 | 13-Dec-21 | Pumpkin | <i>Cucurbita moschata</i> | Takeo | Tram Kak | Trapeang Thom Khang Tboung | Prey Preal | N11-01-57.6 & E104-32-19.4 | 68 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Lpov | Fruit shape: Flattened Fruit skin color: Yellow |
| 2021B72 | 286119 | 2021-156 | 13-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Takeo | Tram Kak | Trapeang Thom Khang Tboung | Prey Preal | N11-01-57.6 & E104-32-19.4 | 68 | Khmer | Weed | Plant | Single plant | Backyard | Pty Doung | |
| 2021B73 | 286120 | 2021-157 | 14-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Krong Doun Kaev | Sangkat Roka Knong | Ang Takok | N11-01-57.3 & E104-32-19.3 | 45 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Oblong Fruit skin color: Yellow with green spots |
| 2021B74 | 286121 | 2021-158 | 14-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Krong Doun Kaev | Sangkat Roka Knong | Ang Takok | N11-01-57.3 & E104-32-19.3 | 45 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Elongated Fruit skin color: Yellow |
| 2021B75 | 286122 | 2021-159 | 14-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Krong Doun Kaev | Sangkat Roka Krau | Thnal Baek | N10-59-52.9 & E104-44-52.7 | 25 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Round Fruit skin color: Gray |
| 2021B76 | 286123 | 2021-160 | 14-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Krong Doun Kaev | Sangkat Roka Knong | Phum Thmei | N10-57-41.1 & E104-46-32.1 | 7 | Khmer | Landrace | Fruit | Single fruit | Market | Trosok Srov | Fruit shape: Oblong with ribs Fruit skin color: Green |
| 2021B77 | 286124 | 2021-161 | 14-Dec-21 | Cultivated melon | <i>Cucumis melo</i> | Takeo | Samraong | Cheung Kuon | Ta Mao | N11-08-01.2 & E104-48-47.9 | 28 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trosok Srov | Fruit shape: Oblong Fruit skin color: Gray |
| 2021B78 | 286125 | 2021-162 | 14-Dec-21 | Wax gourd | <i>Benincasa hispida</i> | Takeo | Samraong | Cheung Kuon | Ta Mao | N11-08-01.2 & E104-48-47.9 | 28 | Khmer | Landrace | Seeds | Bulk fruits | Farmer's storage | Trolach | Fruit shape: Oblong |
| 2021B79 | 286126 | 2021-163 | 14-Dec-21 | Amaranth | <i>Amaranthus</i> sp. | Takeo | Samraong | Cheung Kuon | Ta Mao | N11-08-01.2 & E104-48-47.9 | 28 | Khmer | Weed | Seeds | Bulk plants | Backyard | Pty Doung | |

Table 4. (Continued).

| Coll. No. | JP No. | CARDI No. | Coll. Date | Crop name | Species | Province | District | Commune | Village | Latitude & Longitude | Altitude (m) | Tribe | Plant status | Collection | | | Local Name | Information obtained from farmers |
|-----------|--------|-----------|------------|-------------|---------------------|----------|----------|-------------|----------------------|----------------------------|--------------|-------|--------------|------------|--------------|----------------|-------------|--|
| | | | | | | | | | | | | | | status | method | source | | |
| 2021B80 | 286127 | 2021-164 | 15-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | Koh Thum | Praek Thmei | Kampong Sambuor Krom | N11-06-49.3 & E104-49-13.2 | 14 | Khmer | Weed | Fruit | Single plant | Farmer's field | Trosork Sva | Fruit shape: Oblong Fruit skin color: Pale green with stripes |
| 2021B81 | 286128 | 2021-165 | 15-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | Koh Thum | Praek Thmei | Kampong Sambuor Krom | N11-06-49.3 & E104-49-13.2 | 14 | Khmer | Weed | Fruit | Single plant | Farmer's field | Trosork Sva | Fruit shape: Oblong Fruit skin color: Pale green |
| 2021B82 | 286129 | 2021-166 | 15-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | Koh Thum | Praek Thmei | Kampong Sambuor Krom | N11-06-49.3 & E104-49-13.2 | 14 | Khmer | Weed | Fruit | Single plant | Farmer's field | Trosork Sva | Fruit shape: Oblong Fruit skin color: Pale green |
| 2021B83 | 286130 | 2021-167 | 15-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | S'ang | Praek Ambel | Praek Talei | N11-08-58.9 & E105-02-03.5 | 6 | Khmer | Weed | Fruit | Single plant | Farmer's field | Trosork Sva | Fruit shape: Oblong Fruit skin color: Green with stripes |
| 2021B84 | 286131 | 2021-168 | 15-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | S'ang | Praek Ambel | Praek Talei | N11-08-58.9 & E105-02-03.5 | 6 | Khmer | Weed | Fruit | Single plant | Farmer's field | Trosork Sva | Fruit shape: Oblong Fruit skin color: Pale yellow |
| 2021B85 | 286132 | 2021-169 | 15-Dec-21 | Weedy melon | <i>Cucumis melo</i> | Kandal | S'ang | Praek Ambel | Praek Talei | N11-08-58.9 & E105-02-03.5 | 6 | Khmer | Weed | Fruit | Single plant | Farmer's field | Trosork Sva | Fruit shape: Oblong Fruit skin color: Pale green |



Sample Photo 1.
JP286048, B01,
Amaranthus sp.



Sample Photo 2.
JP286049, B02,
Cucurbita moschata



Sample Photo 3.
JP286050, B03,
Cucumis melo



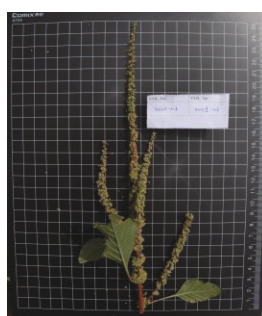
Sample Photo 4.
JP286051, B04,
Amaranthus sp.



Sample Photo 5.
JP286052, B05,
Amaranthus sp.



Sample Photo 6.
JP286053, B06,
Amaranthus sp.



Sample Photo 7.
JP286054, B07,
Amaranthus sp.



Sample Photo 8.
JP286055, B08,
Cucurbita moschata



Sample Photo 9.
JP286056, B09,
Amaranthus sp.



Sample Photo 10.
JP286057, B10,
Amaranthus sp.



Sample Photo 11.
JP286058, B11,
Amaranthus sp.



Sample Photo 12.
JP286059, B12,
Amaranthus sp.



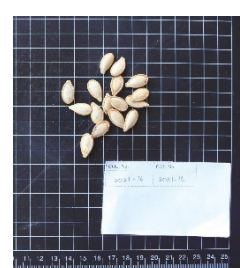
Sample Photo 13.
JP286060, B13,
Amaranthus sp.



Sample Photo 14.
JP286061, B14,
Amaranthus sp.



Sample Photo 15.
JP286062, B15,
Cucurbita moschata

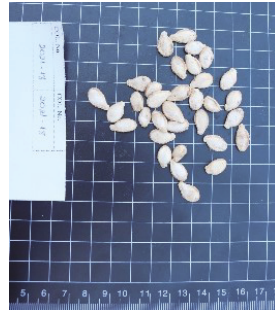


Sample Photo 16.
JP286063, B16,
Cucurbita moschata

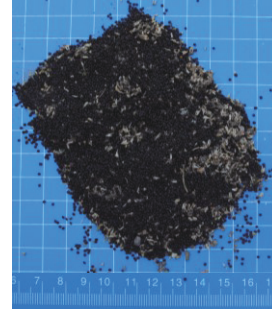
Sample Photos. Samples were collected during exploration. The title of each sample indicates “JP number,” “collection number,” and “species.” Collection numbers “2021B01,” “2021B02,” “2021B03,” etc., are abbreviated as “B01,” “B02,” “B03,” etc.



Sample Photo 17.
JP286064, B17,
Cucumis melo



Sample Photo 18.
JP286065, B18,
Cucurbita moschata



Sample Photo 19.
JP286066, B19,
Amaranthus sp.



Sample Photo 20.
JP286067, B20,
Lagenaria siceraria



Sample Photo 21.
JP286068, B21,
Benincasa hispida



Sample Photo 22.
JP286069, B22,
Cucumis sativus



Sample Photo 23.
JP286070, B23,
Cucumis melo



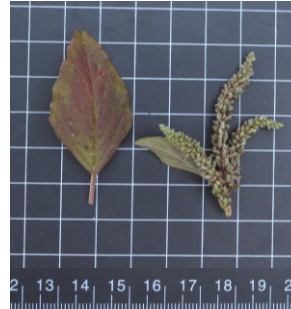
Sample Photo 24.
JP286071, B24,
Cucurbita moschata



Sample Photo 25.
JP286072, B25,
Cucurbita moschata



Sample Photo 26.
JP286073, B26,
Amaranthus sp.



Sample Photo 27.
JP286074, B27,
Amaranthus sp.



Sample Photo 28.
JP286075, B28,
Amaranthus sp.



Sample Photo 29.
JP286076, B29,
Amaranthus sp.



Sample Photo 30.
JP286077, B30, *Cucumis melo* (white seeds)
JP286078, B31, *Citrullus lanatus* (black seeds)



Sample Photo 31.
JP286079, B32,
Benincasa hispida

Sample Photos. (Continued).



Sample Photo 32.
JP286080, B33,
Benincasa hispida



Sample Photo 33.
JP286081, B34,
Cucumis sativus



Sample Photo 34.
JP286082, B35,
Cucumis melo



Sample Photo 35.
JP286083, B36,
Cucurbita moschata



Sample Photo 36.
JP286084, B37,
Cucurbita moschata



Sample Photo 37.
JP286085, B38,
Cucumis melo



Sample Photo 38.
JP286086, B39,
Solanum melongena



Sample Photo 39.
JP286087, B40,
Lagenaria siceraria



Sample Photo 40.
JP286088, B41,
Cucumis melo



Sample Photo 41.
JP286089, B42,
Cucurbita moschata



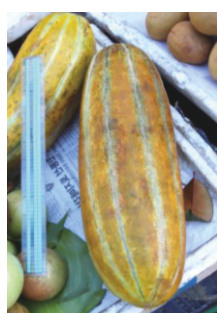
Sample Photo 42.
JP286090, B43,
Benincasa hispida



Sample Photo 43.
JP286091, B44,
Lagenaria siceraria



Sample Photo 44.
JP286092, B45,
Amaranthus sp.



Sample Photo 45.
JP286093, B46,
Cucumis melo



Sample Photo 46.
JP286094, B47,
Zea mays

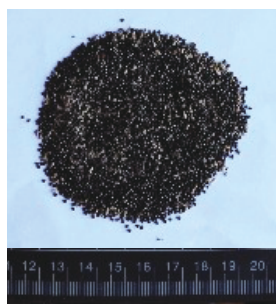


Sample Photo 47.
JP286095, B48,
Cucumis melo

Sample Photos. (Continued).



Sample Photo 48.
JP286096, B49,
Cucumis melo



Sample Photo 49.
JP286097, B50,
Amaranthus sp.



Sample Photo 50.
JP286098, B51,
Cucumis melo



Sample Photo 51.
JP286099, B52,
Cucumis sativus



Sample Photo 52.
JP286100, B53,
Cucumis melo



Sample Photo 53.
JP286101, B54,
Amaranthus sp.



Sample Photo 54.
JP286102, B55,
Cucumis melo



Sample Photo 55.
JP286103, B56,
Cucumis melo



Sample Photo 56.
JP286104, B57,
Cucumis melo



Sample Photo 57.
JP286105, B58,
Cucumis melo



Sample Photo 58.
JP286106, B59,
Cucumis melo



Sample Photo 59.
JP286107, B60,
Cucumis melo



Sample Photo 60.
JP286108, B61,
Cucurbita moschata



Sample Photo 61.
JP286109, B62,
Benincasa hispida



Sample Photo 62.
JP286110, B63,
Cucumis melo

Sample Photos. (Continued).



Sample Photo 63.
JP286111, B64,
Cucumis melo



Sample Photo 64.
JP286112, B65,
Cucurbita moschata



Sample Photo 65.
JP286113, B66,
Benincasa hispida



Sample Photo 66.
JP286114, B67,
Cucumis melo



Sample Photo 67.
JP286115, B68,
Cucumis melo



Sample Photo 68.
JP286116, B69,
Cucurbita moschata



Sample Photo 69.
JP286117, B70,
Cucumis melo



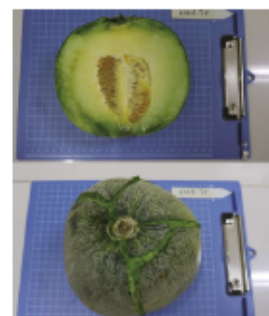
Sample Photo 70.
JP286118, B71,
Cucurbita moschata



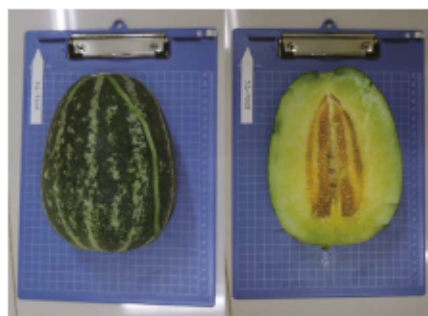
Sample Photo 71
JP286119, B72,
Amaranthus sp.



Sample Photo 72.
JP286120, B73, *Cucumis melo* (Left)
JP286121, B74, *Cucumis melo* (Right)



Sample Photo 73.
JP286122, B75,
Cucumis melo



Sample Photo 74.
JP286123, B76,
Cucumis melo



Sample Photo 75.
JP286124, B77,
Cucumis melo



Sample Photo 76.
JP286125, B78,
Benincasa hispida

Sample Photos. (Continued).



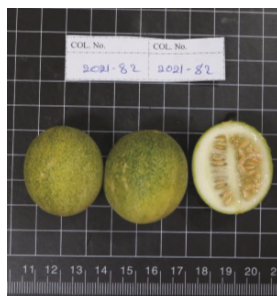
Sample Photo 77.
JP286126, B79,
Amaranthus sp.



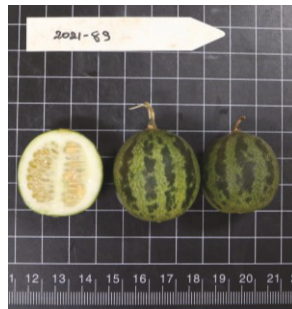
Sample Photo 78.
JP286127, B80,
Cucumis melo



Sample Photo 79.
JP286128, B81,
Cucumis melo



Sample Photo 80.
JP286129, B82,
Cucumis melo



Sample Photo 81.
JP286130, B83,
Cucumis melo



Sample Photo 82.
JP286131, B84,
Cucumis melo



Sample Photo 83.
JP286132, B85,
Cucumis melo

Sample Photos. (Continued).