〔AREIPGR Vol. 37: 114-142, 2021〕
doi:10.24514/00007162

Original Paper

A Field Study on Plant Genetic Resources of Chin State, Myanmar, in February 2019

Makoto KAWASE [1), 2)*], Ohm Mar Saw [3)], Katsumasa NIWA [4)],

Tomotaro NISHIKAWA [2)**]

1) *Faculty of Life and Environmental Sciences, University of Tsukuba*, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8577, Japan
2) *Genetic Resources Center, National Agriculture and Food Research Organization (NARO)*, 2-1-2 Kannondai, Tsukuba, Ibaraki 305-8602, Japan
3) *Biotechnology, Plant Genetic Resources and Plant Protection Division, Department of Agricultural Research, Ministry of Agriculture, Livestock and Irrigation*, Yezin, Nay Pyi Taw, Republic of the Union of Myanmar
4) *Faculty of Agriculture, Tokyo University of Agriculture*, 1737 Funako, Atsugi, Kanagawa 243-0034, Japan

* Present affiliation: *Faculty of Agriculture, Tokyo University of Agriculture*, 1737 Funako, Atsugi, Kanagawa 243-0034, Japan
** Present affiliation: *Core Technology Research Headquarters, National Agriculture and Food Research Organization*, 3-1-1 Kannondai, Tsukuba, Ibaraki 305-8517, Japan

Communicated by K. IRIE (Tokyo University of Agriculture)
Received May 29, 2021, Accepted Dec. 22, 2021
Corresponding author: T. NISHIKAWA (e-mail: tomotaro@affrc.go.jp)

Summary

This paper describes a field study jointly conducted by Myanmar and Japan in February 2019 to document the plant genetic resources (PGRs) of Chin State, Myanmar. The study was a part of PGRAsia, an international joint research project between the Japanese research institutes and gene banks of Asian countries, consigned by the Ministry of Agriculture, Forestry and Fisheries to the National Agriculture and Food Research Organization (NARO) of Japan. It was implemented under a Memorandum of Understanding between NARO and the Department of Agricultural Research (DAR) of Myanmar, which was originally co-signed in 2013 and extended with an addendum in 2018. Previous surveys have indicated that the diversity of the traditional crops of inland Chin State are on the verge of lost, and in the present survey, we focused on plant resources of the mid-south areas of Chin State, including Madupi District. Based on the findings of a previous short survey conducted by Ohm Mar Saw *et al*. (2019) in 2018, we focused on areas surrounding the Madupi Township during the agricultural off-season to collect PGRs and associated information. We collected PGRs mainly from the Mindat Township (Mindat District), Madupi and Retzua Townships (Madupi District), and Hakha Township (Hakha District) and a few PGRs from the Pale Township (Yinmabin District, Sagaing Region) and Pyinmana Township (Naypyidaw Union Territory). A total of 178 plant samples were collected which belonged to the following families: Amaranthaceae (five samples), Apiaceae (two), Araceae (four), Brassicaceae (11), Cucurbitaceae (26), Dioscoreaceae (two), Fabaceae (43), Lamiaceae (13), Malvaceae (11), Pedaliaceae (two), Poaceae (42), Rubiaceae (one), Solanaceae (13), and Zingiberaceae (three). The collected PGRs were divided into two subsets – one to be investigated

and conserved at the DAR Seed Bank of Myanmar and the other at the NARO Genetic Resources Center of Japan. Interviews with locals revealed that the vernacular names of selected crop plants were similar within a given Township in Chin State but often differed between the Townships. A 2005 field study on wild rice varieties of Chin State reported the occurrence of foxtail millet, and we anticipated finding this millet and were able to collect eight seed samples. However, none of these was viable in a germination test, and this indicates an ongoing genetic erosion of plant genetic resources in the study area.

KEY WORDS: Myanmar, Chin State, plant genetic resources, traditionally grown crops, genetic erosion

Introduction

Chin State is located in western Myanmar and bordered domestically by Sagaing Region to the north, Magway Region to the east, and Rakhine State to the south. It shares international boundaries with the Mizoram State and Manipur State of India to the west and Chattogram (Chittagong) District of Bangladesh to the southwest. It is a hilly and mountainous state which is less densely populated and has a limited transport infrastructure compared with plain areas of the country.

In this paper, we describe a joint Myanmar–Japan field study conducted in February 2019 to survey plant genetic resources (PGRs) mainly in Chin State of Myanmar. Similar joint surveys in Chin State have previously focused on traditional crop varieties during and after the Seed Bank Project of the Union of Myanmar (1997–2002) (https://www2.jica.go.jp/en/evaluation/pdf/2001_0601822_3_f.pdf). These include the technical cooperation schemes by the Japan International Cooperation Agency (JICA) for collecting food legumes from the northern parts of the State in 2002 (Tomooka *et al*. 2003), surveying wild rice populations in 2005 (Uga *et al*. 2006), and collecting vegetables from the southern parts in 2006 (Saito *et al.* 2006) and 2017 (Ohm Mar Saw *et al.* 2018). Considering this, Uga *et al.* (2006) commented that "It is noteworthy that foxtail millet, *Setaria italica* (L.) P. Beauv. ssp. *italica*, and finger millet *Eleusine coracana* (L.) Gaertn. ssp. *coracana* were widely grown at mountainous areas at the altitude 1,000 m or more in Chin State."

After surveying the PGRs in Kachin and Chin States in November 2017, Ohm Mar Saw *et al.* (2018) highlighted the importance of traditional crop diversity in the hilly and mountainous areas of Myanmar and stated that "slash-and-burn cultivation fields in both areas are expected to harbor large amounts of agro-biodiversity, and ethnodiversity needs to be systematically surveyed as soon as possible." They also reported that "Recent cultivation of cash crops such as elephant foot yam and coffee, may have almost replaced traditional cultivation of those millets." If we compare the statements from the two reports mentioned above, we can assume that the changes that occurred over the 12 years (2005–2017) indicate a widespread genetic erosion promoted by rapid social modernization and economic liberalization which accompanied the democratization of Myanmar. Therefore, it is essential to survey PGRs in inland Chin State as early as possible. To this end, we planned a joint Myanmar–Japan field study in February 2019 that involved a collaborative initiative between the Genetic Resources Center (GRC) of the National Agriculture and Food Research Organization (NARO) of Japan and the Biotechnology, Plant Genetic Resources and Plant Protection Division of Department of Agricultural Research (DAR) of Myanmar. The field study was implemented as a part of the PGRAsia (Plant Genetic Resources in Asia) project (https://sumire.gene.affrc.go.jp/pgrasia/research_en.php), which was allocated by the Ministry of Agriculture, Forestry and Fisheries to NARO.

We primarily focused on the PGRs of the mid-south region of Chin State, including Madupi District. This selection was based on the opinion that these areas have conserved traditional crop diversity, as indicated by the findings of the aforementioned previous field studies conducted in Chin State and also of those undertaken in the adjacent Sagaing Region (Domon *et al*. 2015a, 2015b; Min San Thein *et al.* 2017; Naito *et al.* 2017); the realization that PGR samples from this region require urgent investigation also affected our selection. We anticipate that PGRs from these areas would be useful materials for future crop improvement and should be conserved in gene banks within the public domain. Additionally, we intended to obtain information on the vernacular names and utilization of both crops and non-crops based on ethnobotanical point of view.

Methods

Our field survey team comprised of Tomotaro Nishikawa (TN, team leader), Ohm Mar Saw (OMS), and Makoto Kawase (MK). We assembled at the Seed Bank of DAR at Yezin, Nay Pyi Taw and entered Chin

State via Nyaung-U town in Mandalay Region using a robust 4 × 4 vehicle. Initially, we surveyed PGRs in the Mindat Township (Mindat District) and Madupi and Retzua Townships (Madupi District) in the mid-south region of Chin State. The Paletwa Township located west-southwest of Mindat District could not be surveyed due to the concurrent political instability of the region. Alternatively, we surveyed Hakha District to the north of Madupi District (Map 1).

Because the survey was conducted during the winter, we rarely observed standing crop plants. Hence, we visited the houses of farmers and local agricultural marketplaces and interviewed the locals to gain information on traditional crops, cultivation practices, and utilization of agricultural produce, particularly cereals, legumes, and vegetables, as well as herbs and spices. We collected plant material as PGRs and recorded crop names, village names, sources of the plant material, cultural practices, sowing and harvesting months, geographical characteristics, and topography. Global positioning system (GPS) information was recorded at each waypoint during the survey using the GPS logger application–Geo Tracker ver. 3.3.0 (https://geo-tracker.org/), installed on a ZenFone 3 smartphone (ZE520KL, ASUS_Z017DA; ASUSTeK Computer Inc.). For altitude measurements, using a device with a small antenna (i.e., a smartphone) may not provide accurate results; hence, the altitude at each waypoint was estimated through Google Earth (Google Inc.) using the relevant waypoint information. For this paper, the names of towns and villages were spelled according to local informants, and when necessary, these were corrected using publicly available information provided by the Myanmar Information Management Unit (MIMU), which serves the UN Country Team and Humanitarian Country Team under the management of the UN Resident and Humanitarian Coordinator (https://data.humdata.org/organization/mimu).

During our interviews with the locals at 11 sites, we showed the interviewees the photographs of 73 selected crops, to know the vernacular names. Though we attempted to write these names down using the Roman alphabet, in the case of communities with indigenous writing systems based on the Roman alphabet, we requested our interviewees to write the crop names using their own scripts.

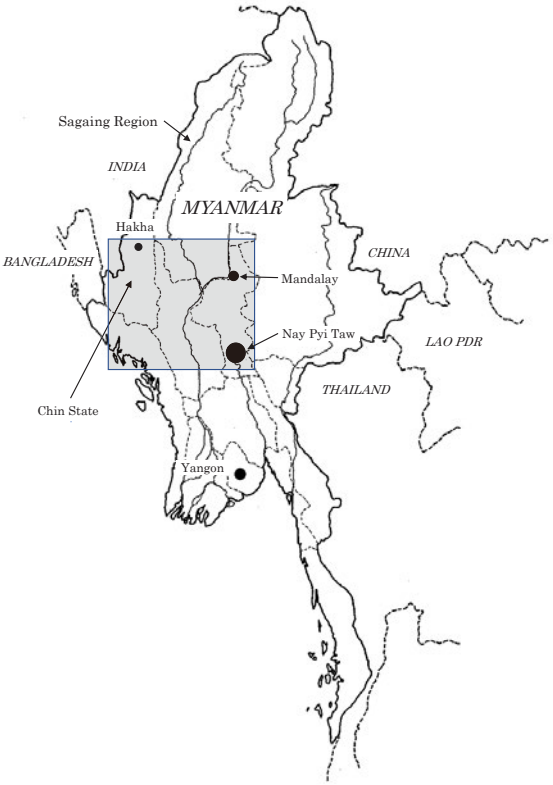
Ethnobotanical information was collected in accordance with the Code of Ethics of the International Society of Ethnobiology (ISE) (http://www.ethnobiology.net/what-we-do/core-programs/ise-ethics-program/code-of-ethics/).

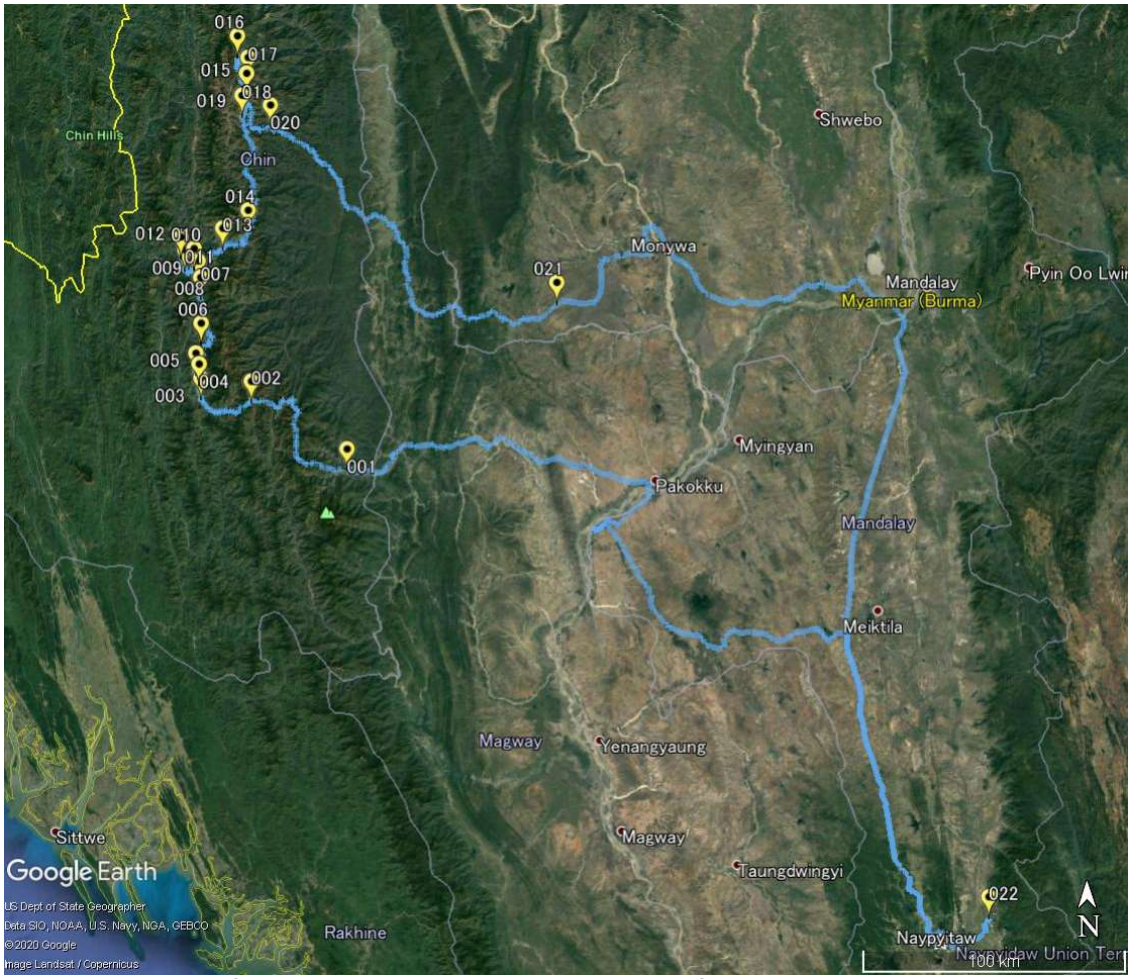
During the present study, we collected eight samples of foxtail millet seeds from the Retzua and Hakha Townships and sowed them in pots filled with sterilized soil for seed multiplication in a greenhouse of the Faculty of Agriculture, Tokyo University of Agriculture in 2019.

Table 1. Itinerary of the February 2019 field study conducted in Myanmar

day	YY/MM/DD	date	root and places	transportation	stay	note	waypoint
1	2019/02/11	MON	TN & MK arrived at Yangon	flight	Yangon		
2	2019/02/12	TUE	Yangon - Yezin	vehicle	Yezin	TN, OMS, MK joined; Visit to DOA Director General	
3	2019/02/13	WED	Yezin - Nyaung-U	vehicle	Nyaung-U	Visit to DAR	
4	2019/02/14	THU	Nyaung-U - Mindat	vehicle	Mindat	Visit to DOA District Office	
5	2019/02/15	FRI	Mindat - Madupi	vehicle	Mindat		1 & 2
6	2019/02/16	SAT	Madupi - Rezua	vehicle	Rezua		3, 4, 5 & 6
7	2019/02/17	SUN	around Rezua	vehicle	Rezua		7. 8. 9. 10, 11 & 12
8	2019/02/18	MON	Rezua - Hakha	vehicle	Hakha		13 & 14
9	2019/02/19	TUE	around Hakha	vehicle	Hakha		15, 16, 17, 18 & 19
10	2019/02/20	WED	Hakha - Monywa	vehicle	Monywa		20 & 21
11	2019/02/21	THU	Monywa - Yezin	vehicle	Yezin	Processing collected materials	
12	2019/02/22	FRI	Yezin	vehicle	Yezin	Processing collected materials	22
13	2019/02/23	SAT	Yezin	vehicle	Yezin		
14	2019/02/24	SUN	Yezin - Yangon	vehicle	Yangon		
15	2019/02/25	MON	Yangon	vehicle	Yangon	Visit to PPD for plant quarantine; Visit to JICA Seed Project site; Visit to PBC	
16	2019/02/26	TUE	Yangon	vehicle	Yangon	Phytosanitary certificate granted	
17	2019/02/27	WED	TN & MK leave Yangon	flight	on board	Visit to EOJ	
18	2019/02/28	THU	TN & MK returned to Japan	flight			

Note:
TN: Tomotaro NISHIKAWA; OMS: Ohm Mar Saw; MK: Makoto KAWASE
DOA: Department of Agriculture; DAR Department of Agricultural Research; PPD: Plant Ptorection Department
JICA Seed Project: Japan International Cooperation Agency "The Project for Improvement on Accessibility of Rice Certified Seed"
PBC: Plant Biotechnology Center of DOA
EOJ: Embassy of Japan





Map 1. A white map of Myanmar (upper). A map showing the routes followed and collection sites (indicated by waypoints) surveyed during the field study in Chin State, Myanmar, in February 2019 (lower), which correspond to the square with a half-tone dotting in the upper white map.

However, none of the seeds germinated. We investigated the viability of these seeds using 100-grains of each of the eight samples. As controls, we used the seeds of a foxtail millet landrace, COL/MYANMAR/2005/NIAS/26, which was collected in 2005 from Lamtuk village (Hakha Township, Chin State) (Uga *et al.* 2006), maintained in cold dry storage at approximately 5 °C for 12 years, and subsequently grown in a greenhouse at the University of Tsukuba and harvested in 2017 (seed stock no. 2017-095-1). The control and eight collected seed samples were stored in sealed boxes containing silica gel in a refrigerator at approximately 4 °C. Before sowing, the seeds were sterilized first using 70% ethanol for 1 min and then sodium hypochlorite solution (containing approx. 1% available chlorine) for 5 min. The seeds were then rinsed twice with deionized water, soaked in 1% Tween 80 (polyoxyethylene 20 sorbitan monooleate) solution for 30 s, treated with 15% hydrogen peroxide for 1 min, and rinsed twice with deionized water. The sterilized seeds were then placed on moist filter papers in Petri dishes and incubated at 30 °C. The germination test was conducted by Katsumasa Niwa (KN) and MK at Tokyo University of Agriculture, Atsugi.

Results and Discussion

During the present survey, we visited villages, cultivation fields, houses of local farmers, and local marketplaces, where we interviewed the locals to gain information on traditionally grown crops and other beneficial plants (non-crops). Our survey coincided with the agricultural off-season for commonly cultivated summer crops (except for *Brassica* species); hence, we witnessed very few standing crops. The locals kindly provided us with samples of local crop varieties; information on associated cultivation practices, vernacular names, and usage; and other relevant details. However, most of the samples were provided from farm storage, and we could not obtain information related to the geography, stoniness, soil texture, and drainage of the cultivation sites.

We collected plant samples from the following areas: Mindat Town (waypoint 001), Layseik village (002) of Mindat District, Madupi Town (003), Phaneng village (004), Nga Leang village (005), and Khua Ngang village (006) in Mindat Township, and Siango village (007), Hring Thang Khna village (008) Retzua town (010), Sawti village (011), Long Thang Tlang village (012), Sha Shi village (013), and Ai Ka village (014) in Rezua Township, Madupi District, Hakha City (015), Chun Cung village (016), Hniar Lawn village (017), Loklung village (018 & 019), and Zokhua village (020) in Hakha Township, Hakha District, Chin State. In addition, we collected plant materials at Tha Pyay Gone village (021) in Pale Township of Yinmabin District in the Sagaing Region and Yezin village (022) in Pyinmana Township in Naypyidaw Union Territory (Map. 1).

Plant genetic resources collected

We collected a total of 178 plant samples during our field study which are listed in Table 3. These consisted of 178 samples belonging to the following families: Amaranthaceae (five), Apiaceae (two), Araceae (four), Brassicaceae (11), Cucurbitaceae (26), Dioscoreaceae (two), Fabaceae (43), Lamiaceae (13), Malvaceae (11), Pedaliaceae (two), Poaceae (42), Rubiaceae (one), Solanaceae (13), and Zingiberaceae (three) (Table 2). Among these, four, 46, 75, and 50 samples were collected from the Mindat, Madupi, and Rezua Townships and Hakha District of Chin State, respectively. Additionally, two samples were collected from the Pale Township (Sagaing Region), while one was from the Pyinmana Township (Naypyidaw Union Territory) (Table 3).

The collected samples comprised a large number of leafy and fruit vegetables, cereals such as rice and millet, edible legumes, root and tuber crops, and herbs and spices, all of which were grown traditionally and primarily for self-consumption rather than for selling in commercial markets. The collected samples also contained some non-traditional crops such as coffee — *Coffea arabica* L. and elephant foot yam — *Amorphophallus paeoniifolius* (Dennst.) Nicolson, which were probably introduced to the region more recently during the democratization of Myanmar. This may have been facilitated by improvements in the regional transport infrastructure, such as the widening and renovation of trunk roads. Although these developments have provided multiple benefits to the local agricultural communities, they may have also heralded significant changes in the types of cultivated crops. We reaffirm the findings of Ohm Mar Saw *et al.* (2018) that the cultivation of traditional crops is giving way to the newly-introduced cash crops, such as elephant foot yam and coffee, in some instances.

We divided the samples collected by us into two subsets: the samples in one subset were investigated and conserved at the Seed Bank of the Plant Biotechnology, Plant Genetic Resources and Plant Protection Department, DAR, Yezin, Nay Pyi Taw Union Territory, Myanmar, for further research and crop improvement; those in the other subset was transferred to Japan to be conserved at the NARO GRC at Tsukuba, Japan, under

Table 2. A summarized list of the materials collected in Chin State, Myanmar, in February 2019

Family scientific species name	English name	Family-wise subtotal	No. of collected materials
Amaranthaceae		5	
Amaranthus tricolor L.	edible amaranth		1
Celosia argentea L.	plumed cockscomb		1
Chenopodium bengalense (Lam.) Spielm. ex Steud.	tree spinach		3
Apiaceae		2	
Coriandrum sativum L.	coriander		1
Daucus carota L.	carrot		1
Araceae		4	
Amorphophallus paeoniifolius (Dennst.) Nicolson	elephant foot yam		1
Colocasia esculenta (L.) Schott	taro		3
Brassicaceae		11	
Brassica juncea (L.) Czern. Group Cernua	leaf mustard		9
Brassica oleracea L. Group Acephala	kale		2
Cucurbitaceae		26	
Benincasa hispida Cogn.	ash gourd		3
Coccinia grandis (L.) Voigt	ivy gourd		1
Cucumis sativus L.	cucumber		8
Cucurbita maxima Duch.	pumpkin		10
Lagenaria siceraria (Molina) Standl. var. *siceraria*	bottle gourd		1
Luffa cylindrica M. Roem	sponge gourd		1
Momordica charantia L. var. *abbreviata* Ser.	small bitter gourd		2
Dioscoreaceae		2	
Dioscorea alata L.	purple yam		2
Fabaceae		43	
Canavalia gladiata (Jacq.) DC.	sword bean		2
Glycine max (L.) Merrill,	soybean		2
Lablab purpureus (L.) Sweet	lablab bean		1
Mucuna pruriens DC. var. *utilis* (Wall. ex Wight) Baker ex	velvet bean		1
Phaseolus lunatus L.	lima bean		4
Phaseolus vulgaris L.	common bean		11
Pisum sativum L.	garden pea		3
Psophocarpus tetragonolobus (L.) DC.	winged bean		2
Vicia faba L.	broad bean		1
Vigna umbellata (Thunb.) Ohwi et Ohashi	rice bean		8
Vigna unguiculata (L.) Walp.	cowpea		8

a Standard Material Transfer Agreement (SMTA) for the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) of the United Nations Food and Agriculture Organization. A phytosanitary certificate was issued by the Plant Protection Office of DOA, Yangon, Myanmar. All plant materials in the second subset were inspected by the Plant Quarantine Inspectors of the Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan at the Narita Airport. Because rice is one of the prohibited imports listed in the Plant Protection Act of Japan, we obtained a special permit issued in the name of the Minister, MAFF, Japan, to introduce these seeds into Japan. Moreover, rice samples were cultivated in an isolated greenhouse of the NARO GRC under the supervision of a plant quarantine officer.

Table 2. (Continued).

Family scientific species name	English name	Family-wise subtotal	No. of collected materials
Lamiaceae		13	
Elsholtzia blanda (Benth.) Benth.	elshortzia basil		3
Ocimum basilicum L.	basil		4
Perilla frutescens (L.) Britton var. *frutescens*	perilla		6
Malvaceae		11	
Abelmoschus esculentus (L.) Moench	okra		2
Gossypium barbadense L.	cotton		1
Hibiscus sabdariffa L.	roselle		8
Pedaliaceae		2	
Sesamum indicum L.	sesame		2
Poaceae		42	
Eleusine coracana (L.) Gaertn. ssp. *coracana* Hilu et de Wet	finger millet		2
Miscanthus nepalensis (Trinius) Hackel	wild miscanthus grass		1
Oryza sativa L.	rice		15
Setaria italica (L.) P. Beauv. ssp. *italica*	foxtail millet		8
Zea mays L.	maize		16
Rubiaceae		1	
Coffea arabica L.	coffee		1
Solanaceae		13	
Capsicum annuum L.	chili pepper		8
Solanum aethiopicum L.	Ethiopian eggplant		1
Solanum lycopersicum L.	tomato		4
Zingiberaceae		3	
Curcuma longa L.	turmeric		2
Zingiber officinale Rosc.	ginger		1
Total			178

Observations in Chin State

Mindat (waypoint 001) is a small town located at the entrance of Chin State when accessing from Pakokku. We observed a range of different vegetables and food legumes (Photo 1) being traded at the Mindat Myoma Zay marketplace, where agricultural produce was brought from neighboring villages. We noticed a recently constructed reinforced concrete building which was a sign of rapid modernization in the area and was not present in November 2018. Nevertheless, traders at the marketplace continued to sell agricultural products and other food commodities from the more traditional bower-style stalls and on-street stores.

After crossing several passes at elevations of over 2,000 m above mean sea level, where *Rhododendron* trees were often observed (Photo 2), we visited Madupi (waypoint 003; alternatively spelled Matupi), a small town located amid the Chin Hills. Agricultural products transported from surrounding villages were being sold at the Madupi marketplace (Photo 3). In addition to common leafy and fruit vegetables, seeds of different types of food legumes [*Vigna umbellata* (Thunb.) Ohwi & Ohashi, *V. unguiculata* (L.) Walp. Group Unguiculata, *Phaseolus vulgaris* L., *P. lunatus* L., and *Pisum sativum* L.] were available at the marketplace at wooden bower-style stalls and on-street stores. These crops are widely grown in several areas in Myanmar. It was interesting to note that the dried panicles of the elsholtzia basil (*Elsholtzia blanda* (Benth.) Benth.) (Photo 4) and seeds of perilla (*Perilla frutescens* (L.) Britton var. *frutescens*) were also available at the marketplace. These plants are often grown in the hilly and mountainous areas of Myanmar and neighboring Nagaland, India (Domon *et al*. 2015a) and are used as herbs and spices in various

Photo 1. Vegetables harvested from neighboring villages being sold at the Mindat Myoma Zay marketplace in Mindat town (waypoint 001), Chin State

Photo 2. *Rhododendron* flowers were seen in the high mountain areas between the towns of Mindat and Madupi in Chin State

preparations. The seeds of *P. frutescens* are used to extract the oil. Furthermore, we also found young pods of *Cajanus cajan* (L.) Millsp. and *Parkia speciosa* Hassk. being sold as vegetables (Photo 5).

On our subsequent visit to three villages in the Madupi Township — Phaneng village (waypoint 004), Nga Leang village (005), and Khua Ngang village (006) — we collected traditional varieties of rice (*Oryza sativa* L.), maize (*Zea mays* L.), food legumes [*V. umbellata*, *V. unguiculata*, and *Psophocarpus tetragonolobus* (L.) DC.], root and tuber crops (*Dioscorea alata* L. and *Zingiber*

Photo 3. A range of food materials produced in neighboring hill villages being sold at a marketplace in Madupi town (waypoint 003), Chin State

Photo 4. Elshotzia basil, *Elsholtzia blanda* (Benth.) Benth., sold at a marketplace in Madupi town (waypoint 003), Chin State

Photo 5. Young pods of *Parkia speciosa* Hassk. (left) are also sold as vegetables at a marketplace in Madupi town (waypoint 003), Chin State

Photo 6. Harvested panicles of tree spinach, *Chenopodium bengalense* Spielm. ex Steud., are hung beneath the eaves of houses in Khua Ngang village (waypoint 006), Madupi Township, Chin State

Photo 7. Species of *Ocimum* are important spices in the hilly and mountainous areas of Myanmar. The plants shown here were hung on the kitchen wall of a house in Ai Ka village (waypoint 014), Retzua Township, Chin State

Photo 8. Traditional keeping of stingless bees is practiced in Hring Thang Khna village (waypoint 008), Retzua Township, Chin State. The type of stingless bee shown here constructs a trumpet-shaped entrance (indicated by an arrow) to the hive.

officinale Rosc.), and Cucurbitaceae crops (*Luffa cylindrica* M. Roem, *Cucumis sativus* L., and *Cucurbita maxima* Duch.), all of which are commonly grown throughout Myanmar. The less extensively cultivated traditional crops such as tree spinach (*Chenopodium bengalense* Spielm. ex Steud.) (Photo 6) and elsholtzia basil were also collected from here. However, we could not locate any finger millet (*E. coracana* ssp. *coracana*) or foxtail millet (*S. italica* ssp. *italica*) in Madupi Township, which Uga *et al.* (2006) found being cultivated in abundance for food and brewing during a 2005 survey. We also observed the cultivation of recently introduced cash crops — elephant foot yam and coffee — at several sites, including Khua Ngang village (006).

Moving northward from Madupi, we visited Siango village (waypoint 007) and Hring Thang Khna village (008 & 009), Retzua town (010), Sawti village (011), Long Thang Tlang village (012), Sha Shi village (013), and Ai Ka village (014) in the Retzua (alternatively spelled Rezua) Township, Madupi District. These small communities are scattered in hilly areas and, owing to the poor regional transport infrastructure, tend to be self-sufficient and economically isolated. In common with Madupi Township, we found that various leafy and fruit vegetables, as well as rhizomatous crops, were widely cultivated in this region. Although cash crops such as elephant foot yam have been introduced to the region, the locals experience difficulties in transporting the harvested material to markets in the large towns

Photo 9. Traditional keeping of stingless bees is practiced in Hring Thang Khna village (waypoint 008), Retzua Township, Chin State. The type of stingless bee shown here constructs an embanked entrance (indicated by an arrow) to the hive.

Photo 10. Pasturing of domesticated cattle, mithun (or gayal) (*Bos frontalis* Lambert), in Retzua Township, Chin State

Photo 11. A vegetable store at the marketplace in Hakha City (waypoint 015) selling a range of fresh vegetables and high-quality cereals and food legumes, some of which may have been brought from large cities such as Yangon and Mandalay

Photo 12. A glass of wine made from foxtail millet grains brewed using a traditional method

and cities where this produce is typically consumed. Moreover, samples of foxtail millet and finger millet were collected from farm storage, which implied that these crops were cultivated until recently. Tree spinach, elsholtzia basil, basil (*Ocimum basilicum* L.) (Photo 7), and perilla were grown by farmers for domestic consumption.

A further noteworthy observation was the continuation of traditional beekeeping practices, with stingless bees (Hymenoptera: Apidae: Meliponini) being reared in several villages in Retzua Township. We observed two different types of stingless bees: one that constructed a trumpet-shaped entrance to the hive (Photo 8) and the other that manufactured an embanked entrance (Photo 9); however, we did not identify the species. A similar keeping of stingless bees has been observed over the border in India at Udhiaguri village (Baksa district, Bodoland Territorial Region of Assam state) and Tusom Christian village (Ukhrul district, Manipur state) (Kawase, unpublished observation). We also observed domesticated cattle (mithun or gayal, *Bos frontalis* Lambert) pastured in the Retzua Township (Photo 10), which is also reared in the hilly areas of the Sagaing Region, Myanmar, bordering Northeast India and Bhutan.

We also visited Hakha City (waypoint 015)

Photo 13. Burning plants for the slash-and-burn cultivation on a hillside in the suburbs of Hakha City

Chun Cung village (016), Hniar Lawn village (017), Loklung village (018 & 019), and Zokhua village (020) in the Hakha Township, Hakha District. Hakha City is the capital of Chin State and shops at the Hakha City marketplace sell a variety of fresh vegetables, cereals, and food legumes produced in the neighboring villages; other food commodities might come from large cities such as Yangon and Mandalay (Photo 11). The agricultural products traded here were similar to those available in the Townships of Mindat, Madupi, and Retzua, but were more abundant. We observed plants being burned for locally practiced slash-and-burn

cultivation on a hillside in the suburbs of Hakha City (Photo 12).

Our visit to Hakha City unexpectedly coincided with a period of Chin National Day celebrations, as a part of which, an exposition attended by State Counsellor Ms. Aung San Suu Kyi was being held at the city's Hakha Stadium. There were well-decorated areas within the stadium where the DOA and other public and private sector organizations exhibited their products and inventions and provided relevant information. Notably, in a remote corner of the stadium, young members of the Students' Union of Hakha College operated a drinks booth where we were offered wine made from traditionally brewed foxtail millet grains (Photo 13). We hope that such initiatives would stimulate further interest in studying the past through reviving traditional practices and products.

Among the three townships to which we paid short visits, the people of Retzua maintained the cultivation of the most extensive variety of traditional crops, including foxtail millet, finger millet, and perilla. Though we could not cover the entire township due to our short itinerary, we recommend re-surveying the Retzua Township during the harvest season (October-November) and collecting PGRs from standing crops rather than seeds that have been stored for long-term. Furthermore, we were unable to gain access to the isolated township of Paletwa which is a potential target area for future surveys.

Vernacular names of crops in the surveyed areas

To verify the recognition of the crops cultivated in the surveyed areas, we showed the locals the same set of printed photographs of 73 crops that had been used in previous trips and recorded the associated vernacular names used at particular sites. These records could be considered a preliminary inventory of the vernacular names of crops in the regions in which different indigenous languages and/or dialects are spoken. Although these records undoubtedly include some names that were either misheard or less appropriately transliterated because of our unfamiliarity with the local phonetic systems, we believe that they would provide a useful reference for future studies. During our interviews with the locals, we came to realize that it is generally difficult to ascertain exact crop names that correspond directly to a specific taxonomic species, as the folk taxonomy does not always reflect the taxonomic conventions of systematic botany. Moreover, the names our interviewees provided us after inspecting the photographs depended on their perception of a given crop image. For example, in cases of plants they were unfamiliar with, they tended to suggest the name of a plant they believed the image to be of or provide second-hand information. Moreover, they often hesitated to say, "we don't know", because they might be afraid to disappoint us. Complicating the matter., most of the individuals that we interviewed lived in multilingual societies and attempted to provide names in as many languages as they knew.

Despite the difficulties, we succeeded in compiling a list of the vernacular names of 42 of the 73 crops for each township (Table 4), which represents the crops for which we obtained vernacular names in 6 or more sites (of the total 11 sites wherein interviews were conducted). Names previously collected from the Mindat and Madupi Townships in November 2017 were included in the list for comparative purposes (partially published by Ohm Mar Saw *et al*. 2018). The names for each crop in the Madupi (6 sites) and Retzua (5 sites) Townships showed considerable similarities within the sites in each township, whereas the names for the same crop were often significantly different in different townships. Due to the limited information obtained from the townships of Hakha (3 sites) and Mindat, we could not make useful comparisons; hence, we highlight the need for more extensive interviews in these townships. In some cases, crops were referred to by the names same as those used in the Burmese language spoken by the Bama people (Burmese people in the strict sense) or variations thereof. These names are indicated as "as Bama" and "like Bama," respectively, in Table 4. Burmese is the lingua franca of Myanmar and is taught in schools throughout the country, and we found that most of the locals we interviewed with could understand Burmese. Furthermore, it is possible that a few names have been derived from, or influenced by, the English, Hindi, and/or Mizo languages. However, despite the preliminary nature of our findings, we believe that our information would serve as a reference to succeeding researchers and younger generations of local communities to gain a wider and more accurate understanding of traditional crops and their cultivation.

Detailed data on the vernacular names collected in the present field survey, together with those obtained in other relevant field studies, are being compiled and will be published elsewhere in its entirety.

Genetic erosion of crop resources in Chin State

The findings of the preliminary study conducted by Ohm Mar Saw *et al.* (2018) provided evidence to indicate the ongoing erosion of crop plant genetic resources in Chin State. Communities inhabiting the widely dispersed

Table 5. Seed viability of eight collected samples of foxtail millet (*Setaria italica* ssp. *italica*) revealed by a germination test

Seed stock used	No. of seed sown	No of germinating plants three days after sown	germination (%)
COL/MYANMAR/2018/UT-NARO-DAR/76	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/85	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/102	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/108	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/144	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/164	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/174	100	0	0
COL/MYANMAR/2018/UT-NARO-DAR/175	100	0	0
COL/MYANMAR/2005/NIAS/59	100	0	0
2017-095-1*	100	97	97

* COL/MYANMAR/2005/NIAS/26 was grown and a selfed panicle was harvested from a plant denoted “2017-095-1.”

villages of inland Chin State continue to cultivate a considerable variety of traditional crops under the slash-and-burn agriculture and terraced paddy field systems as well as in backyard gardens. In many cases, however, these crop plants are on the verge of extinction due to the recent introduction of cash crops and improvements in regional transport links that are progressively connecting remote villages with large cities, both physically and economically. Such profound social and economic changes are inevitable and will gradually improve the living standards of local communities. As a consequence, however, it seems equally inevitable that the traditional crops and varieties that have sustained the local life and indigenous culture for generations will be lost gradually.

In this field study, we surveyed parts of Mindat Township, Madupi Township and Hakha Township in Chin State and successfully collected a variety of PGRs. Unfortunately, the eight samples of foxtail millet seeds, which we collected from the Retzua and Hakha Townships and sowed for purpose of seed multiplication, did not germinate (Table 5). Among these seed samples, we did not anticipate high germinability in three samples obtained from marketplaces in the Hakha Township because these had already been dehulled for sale. However, we had anticipated the remaining seed samples to germinate because these were sourced directly from farm storage. Contrastingly, the control seeds from the 2017-095-1 seed stock, which had been preserved dry at around 4 °C for more than 3 years after the harvest, showed a high germination rate (97%). The results indicate that foxtail millet is an orthodox seed plant that can retain viability for long periods when preserved under appropriate conditions. This further suggests that all the foxtail millet seeds collected from the Retzua and Hakha Townships had lost their viability during post-harvest storage and confirms genetic erosion.

From a wider perspective on the results of our study, we conclude that less extensively grown crops should not be ignored, as we cannot reliably predict which crops, varieties, or genotypes might be of value to crop improvement in times of global climate change. In this context, much of Chin State remains relatively unexplored and warrants timely in-depth surveys, preferably during the harvest season. Moreover, it is also of considerable importance to undertake appropriate characterization and evaluation measures for PGRs collected in various programs, including PGRAsia.

Acknowledgements

We are sincerely grateful to the locals of the surveyed areas for their kindness and hospitality. We particularly thank them for comprehensively explaining their agricultural practices and providing samples of cultivated crops and other useful plants. We also wish to express our sincere gratitude to the authorities at the Ministry of Agriculture, Livestock and Irrigation (MOALI), Republic of the Union of Myanmar, for their proactive cooperation. The field study was conducted as a cooperative research activity under the “Memorandum of Understanding for Collaborative Research Project on

Genetic Resources for Food and Agriculture" between the Department of Agricultural Research (DAR), Ministry of Agriculture and Irrigation (now reorganized as the Ministry of Agriculture, Livestock and Irrigation), Myanmar and the National Institute of Agrobiological Sciences (NIAS; reorganized as the National Agriculture Research Organization, NARO), Japan, which were signed bilaterally in 2014 and extended with a mutually agreed Addendum in 2017. We would like to express our cordial thanks to Dr. Naing Kyi Win, Director General, DAR, MOALI, Daw Nwe Nwe Yin, Director, BPGRPPD, DAR. We thank the Seed Bank staff for processing collected plant genetic resources. We are obliged to Dr. Ye Tint Tun, Director General of the Department of Agriculture (DOA), MOALI, for his kind assistance and advice. We are indebted to all the DOA officers at Mindat District Office, Madupi Township Office, Retzua Township Office, and Hakha District Office of the DOA for their kind assistance during our local visits and interviews with local inhabitants. Finally, we are particularly grateful to U Win Naing for his safe driving on risky roads in hilly and mountainous areas.

This work was supported by MAFF commissioned project study on "A Collaborative Research Project on Characterization and Evaluation of Plant Genetic Resources for Food and Agriculture (PGRAsia)" Grant Number JPJ007117).

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ミャンマー連邦共和国チン州における
植物遺伝資源探索現地調査（2019 年 2 月）

河瀬 眞琴[1), 2)*]・Ohm Mar Saw[3)]・丹羽 克昌[4)]・西川 智太郎[2)**]

1) 筑波大学 生命環境科学研究科
2) 国立研究開発法人 農業・食品産業技術総合研究機構 遺伝資源センター
3) ミャンマー農業畜産灌漑省 農業研究局バイテク・植物遺伝資源・植物保護部
4) 東京農業大学 農学部

* 現所属 : 東京農業大学農学部
** 現所属 : 国立研究開発法人農業・食品産業技術総合研究機構 基盤技術研究本部 研究推進室

和文摘要

本報告書は 2019 年 2 月にミャンマー国チン州で実施した植物遺伝資源に関する日本・ミャンマー共同探索調査の報告である．本調査は，農林水産省委託プロジェクト PGRAsia の一部として計画され，ミャンマー国農業研究局と農研機構の間の合意に基づいて実施された．ミャンマー・日本両国の協力によるこれまでの食料農業植物遺伝資源の収集調査の結果，チン州内陸部の伝統的作物の多様性が絶滅の危機に瀕していることが示唆されており，マドゥピ県を含むチン州の中南部を対象地域に決定した．ミンダッ県ミンダッ郡区，マドゥピ県マドゥピ郡区とレッツア郡区，ならびにハカ県ハカ郡区で植物遺伝資源を収集調査した．また，チン州以外ではサガイン地方域インマビン県パレ郡区とネピドー連邦域ピンマナ郡区でも植物遺伝資源を収集した．本調査の結果，合計 178 点の植物遺伝資源を収集した．それらは，ヒユ科（5 点），セリ科（2），サトイモ科（4），アブラナ科（11），ウリ科（26），ヤマノイモ科（2），マメ科（43），シソ科（13），アオイ科（11），ゴマ科（2），イネ科（42），アカネ科（1），ナス科（13），およびショウガ科（3）であった．収集された遺伝資源は 2 つのサブセットに分け，ひとつはミャンマーのシードバンクで保存され，もうひとつは日本の農研機構の遺伝資源センターで保存される．地元の人々へのインタビューを通じて作物の方名（現地での呼称）を聞き取ったところ，各郡区内ではかなり似かよっているが，郡区と郡区の間ではしばしば異なる傾向があることが分かった．今までの調査で多様性が期待されたアワは 8 点収集できたが，全て発芽せず，近年急速にコンニャクやコーヒー等の換金作物の導入とともに遺伝的浸食が急速に進んでいることが明らかになった．

Table 3. A list of plant materials collected in Chin State, Myanmar, in February 2019

Col. No.*	JP No.	Scientific name	English name	Date YYYY/ MM/dd	Country	State/ Region	Township	Village name and/or nearest town/village	site/source	Way-point	Latitude (N)			Longitude (E)			Altitude
											°	′	"	°	′	"	m
1	269661	*Perilla frutescens* (L.) Britton var. *frutescens*	perilla	2/15/2019	Myanmar	Chin	Mindat	Mindat	village marketplace	001	21	22	16	93	58	11	1,396
2	269662	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/15/2019	Myanmar	Chin	Mindat	Mindat	village marketplace	001	21	22	16	93	58	11	1,396
3	269663	*Vigna unguiculata* (L.) Walp.	cowpea	2/15/2019	Myanmar	Chin	Mindat	Mindat	village marketplace	001	21	22	16	93	58	11	1,396
4	269664	*Zea mays* L.	maize	2/15/2019	Myanmar	Chin	Mindat	Layseik	farm storage	002	21	35	57	93	37	34	1,847
5	269665	*Elsholtzia blanda* (Benth.) Benth.	elshortzia basil	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
6	269666	*Perilla frutescens* (L.) Britton var. *frutescens*	perilla	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
7	269667	*Cucurbita maxima* Duch.	pumpkin	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
8	269668	*Vigna unguiculata* (L.) Walp.	cowpea	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
9	269669	*Phaseolus lunatus* L.	Lima bean	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
10	269670	*Phaseolus lunatus* L.	Lima bean	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
11	269671	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
12	269672	*Capsicum annuum* L.	pepper	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
13	269673	*Phaseolus vulgaris* L.	common bean	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
14	269674	*Pisum sativum* L.	garden pea	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
15	269675	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
16	269676	*Phaseolus vulgaris* L.	common bean	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
17	269677	*Hibiscus sabdariffa* L.	roselle	2/16/2019	Myanmar	Chin	Madupi	Madupi	village marketplace	003	21	36	42	93	26	18	1,120
18	269678	*Zea mays* L.	maize	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
19	269679	*Vigna unguiculata* (L.) Walp.	cowpea	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
20	269680	*Luffa cylindrica* M. Roem	sponge gourd	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
21	269681	*Elsholtzia blanda* (Benth.) Benth.	elshortzia basil	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
22	269682	*Benincasa hispida* Cogn.	ash gourd	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
23	269683	*Psophocarpus tetragonolobus* (L.) DC.	winged bean	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
24	269684	*Ocimum basilicum* L.	basil	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
25	269685	*Dioscorea alata* L.	purple yam	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
26	269686	*Celosia argentea* L.	plumed cockscomb	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
27	269687	*Colocasia esculenta* (L.) Schott	taro	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
28	269688	*Chenopodium bengalense* Spielm. ex Steud.	tree spinach	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
29	269689	*Cucumis sativus* L.	cucumber	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
30	269690	*Abelmoschus esculentus* (L.) Moench	okra	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
31	269691	*Zingiber officinale* Rosc.	ginger	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
32	269692	*Dioscorea alata* L.	purple yam	2/16/2019	Myanmar	Chin	Madupi	Phaneng	farm storage	004	21	39	33	93	25	55	1,181
33	269693	*Oryza sativa* L.	rice	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
34	269694	*Zea mays* L.	maize	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
35	269695	*Oryza sativa* L.	rice	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
36	269696	*Oryza sativa* L.	rice	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
37	269697	*Oryza sativa* L.	rice	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
38	269698	*Cucurbita maxima* Duch.	pumpkin	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
39	269699	*Vigna unguiculata* (L.) Walp.	cowpea	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
40	269700	*Cucumis sativus* L.	cucumber	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251

Table 3. (Continued).

Col. No.*	JP No.	Status	Status of plant sampled	Local plant name "local variety name"	Cultural practices	Sowing month	Harvest month	Other observations	Topography	Site	Stoniness	Soil texture	Drainage
1	269661	seeds	landrace	khie				Mindat Myoma Zay market, various food preparation	hilly/mountainous				
2	269662	seeds	landrace	bei tha				Mindat Myoma Zay market, various food preparation	hilly/mountainous				
3	269663	seeds	landrace	mrui				Mindat Myoma Zay market, various food preparation	hilly/mountainous				
4	269664	seeds	landrace	vai pung					hilly/mountainous	slope			
5	269665	seeds	landrace	vai pung				for meat dish	hilly/mountainous				
6	269666	seeds	landrace	chippen					hilly/mountainous				
7	269667	seeds	landrace	po-mung					hilly/mountainous				
8	269668	seeds	landrace	mae-dong				Group Sesqipedalis	hilly/mountainous				
9	269669	seeds	landrace	pe-thai					hilly/mountainous				
10	269670	seeds	landrace	kare-thai					hilly/mountainous				
11	269671	seeds	landrace	kasi					hilly/mountainous				
12	269672	seeds	landrace						hilly/mountainous				
13	269673	seeds	landrace						hilly/mountainous				
14	269674	seeds	landrace						hilly/mountainous				
15	269675	seeds	landrace						hilly/mountainous				
16	269676	seeds	landrace	kasin				explained by a Bama not by a local	hilly/mountainous				
17	269677	seeds	landrace						hilly/mountainous				
18	269678	seeds	landrace	kuem hnong	shifting				hilly/mountainous				
19	269679	seeds	landrace	mai dawl thaih	shifting				hilly/mountainous				
20	269680	seeds	landrace	bung yong thaih	shifting				hilly/mountainous				
21	269681	seeds	landrace	cang kuang koi	shifting				hilly/mountainous				
22	269682	seeds	landrace	al mai thaih	shifting				hilly/mountainous				
23	269683	seeds	landrace	pui thal nae					hilly/mountainous				
24	269684	seeds	landrace	cang rhuek					hilly/mountainous				
25	269685	seeds	landrace	thueon thaih					hilly/mountainous				
26	269686	seeds	landrace	al hawt al					hilly/mountainous				
27	269687	vegetative	landrace	bal				conserved only in Myanmar Seed Bank	hilly/mountainous				
28	269688	seeds	landrace	ti hoe koi				no seed was obtained	hilly/mountainous				
29	269689	seeds	landrace	zil tang mu					hilly/mountainous				
30	269690	seeds	landrace	sai be thai					hilly/mountainous				
31	269691	seeds	landrace	sang kek					hilly/mountainous				
32	269692	seeds	landrace	ba rha					hilly/mountainous				
33	269693	seeds	landrace	"madu"	shifting, Mar-Oct			direct sawing just after burned, short awn, non-waxy	hilly/mountainous				
34	269694	seeds	landrace						hilly/mountainous				
35	269695	seeds	landrace	"mizora tok sho"				upland rice, waxy	hilly/mountainous				
36	269696	seeds	landrace	"sam mho"				slight red rice, waxy	hilly/mountainous				
37	269697	seeds	landrace	"dek ki"				waxy, violet rice	hilly/mountainous				
38	269698	seeds	landrace		shifting				hilly/mountainous				
39	269699	seeds	landrace	mador thai					hilly/mountainous				
40	269700	seeds	landrace	tang thai					hilly/mountainous				

Table 3. (Continued).

Col. No.*	JP No.	Scientific name	English name	Date YYYY/ MM/dd	Country	State/ Region	Township	Village name and/or nearest town/village	site/source	Way-point	Latitude (N)			Longitude (E)			Altitude
											º	′	"	º	′	"	m
41	269701	*Chenopodium bengalense* Spielm. ex Steud.	tree spinach	2/16/2019	Myanmar	Chin	Madupi	Nga Leang	farm storage	005	21	41	42	93	25	14	1,251
42	269702	*Chenopodium bengalense* Spielm. ex Steud.	tree spinach	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
43	269703	*Capsicum annuum* L.	chili pepper	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
44	269704	*Vigna unguiculata* (L.) Walp.	cowpea	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
45	269705	*Elsholtzia blanda* (Benth.) Benth.	elshortzia basil	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
46	269706	*Oryza sativa* L.	rice	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
47	269707	*Zea mays* L.	maize	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
48	269708	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
49	269709	*Coffea arabica* L.	coffee	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
50	269710	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/16/2019	Myanmar	Chin	Madupi	Khua Ngang	farm storage	006	21	47	46	93	26	23	1,341
51	269711	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Siango	farmland	007	21	57	2	93	26	16	1,160
52	269712	*Canavalia gladiata* (Jacq.) DC.	sword bean	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
53	269713	*Sesamum indicum* L.	sesame	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
54	269714	*Zea mays* L.	maize	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
55	269715	*Vigna unguiculata* (L.) Walp.	cowpea	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
56	269716	*Phaseolus vulgaris* L.	common bean	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
57	269717	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
58	269718	*Phaseolus lunatus* L.	Lima bean	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
59	269719	*Colocasia esculenta* (L.) Schott	taro	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
60	269720	*Colocasia esculenta* (L.) Schott	taro	2/17/2019	Myanmar	Chin	Rezua	Siango	farm storage	007	21	57	2	93	26	16	1,160
61	269721	*Zea mays* L.	maize	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
62	269722	*Canavalia gladiata* (Jacq.) DC.	sword bean	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
63	269723	*Perilla frutescens* (L.) Britton var. *frutescens*	perilla	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
64	269724	*Hibiscus sabdariffa* L.	roselle	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
65	269725	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
66	269726	*Cucumis sativus* L.	cucumber	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
67	269727	*Cucurbita maxima* Duch.	pumpkin	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
68	269728	*Benincasa hispida* Cogn.	ash gourd	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
69	269729	*Capsicum chinense* Jacq.	chili pepper	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
70	269730	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
71	269731	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
72	269732	*Phaseolus lunatus* L.	Lima bean	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
73	269733	*Lablab purpureus* (L.) Sweet	lablab bean	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
74	269734	*Solanum lycopersicum* L.	tomato	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
75	269735	*Amorphophallus paeoniifolius* (Dennst.) Nicolson	elephant foot yam	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
76	269736	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109
77	269737	*Eleusine coracana* (L.) Gaertn. ssp. *coracana* Hilu et de Wet	finger millet	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	farm storage	008	22	0	28	93	25	33	1,109

Table 3. (Continued).

Col. No.*	JP No.	Status	Status of plant sampled	Local plant name "local variety name"	Cultural practices	Sowing month	Harvest month	Other observations	Topography	Site	Stoniness	Soil texture	Drainage
41	269701	seeds	landrace	ta hue kai					hilly/mountainous				
42	269702	seeds	landrace	long bek					hilly/mountainous				
43	269703	seeds	landrace						hilly/mountainous				
44	269704	seeds	landrace						hilly/mountainous				
45	269705	seeds	landrace					mix with chilipepper to make a source	hilly/mountainous				
46	269706	seeds	landrace	"lisong"	shifting	Mar/Apr	Oct/Nov		hilly/mountainous				
47	269707	seeds	landrace					waxy	hilly/mountainous				
48	269708	seeds	landrace	"pe thi"		Mar/Apr	Aug/Sep		hilly/mountainous				
49	269709	seeds	landrace						hilly/mountainous				
50	269710	seeds	landrace						hilly/mountainous				
51	269711	seeds	landrace						hilly/mountainous				
52	269712	seeds	landrace		backyard				hilly/mountainous				
53	269713	seeds	landrace		shifting, backyard	May	Nov	small grains, white and black mixed	hilly/mountainous				
54	269714	seeds	landrace		backyard				hilly/mountainous				
55	269715	seeds	landrace		backyard				hilly/mountainous				
56	269716	seeds	landrace		backyard			black seed color	hilly/mountainous				
57	269717	seeds	landrace	mon hnyin	backyard				hilly/mountainous				
58	269718	seeds	landrace	pe	backyard, burn Mar, sawn Mar/August, seed harvest June/Nov	Mar/Aug	Jun/Nov	white seed color, the cultivar was from Madupi, cultivating two times per year	hilly/mountainous				
59	269719	vegetative	landrace					large bulb	hilly/mountainous				
60	269720	vegetative	landrace					small bulb	hilly/mountainous				
61	269721	seeds	landrace	pahw wyn	shifting	Mar/Apr	Sep/Oct		hilly/mountainous				
62	269722	seeds	landrace	cca haw	shifting			sawn together with maize	hilly/mountainous				
63	269723	seeds	landrace		shifting	Mar		ground and used for meat dish	hilly/mountainous				
64	269724	seeds	landrace	mae khui		Mar			hilly/mountainous				
65	269725	seeds	landrace	bia	shifting			mix with maize and boil	hilly/mountainous				
66	269726	seeds	landrace						hilly/mountainous				
67	269727	seeds	landrace	mae ei					hilly/mountainous				
68	269728	seeds	landrace	mae raw	ordinary field, shifting, backyard				hilly/mountainous				
69	269729	seeds	landrace	ei thah, "ei thah ccia"	backyard			ei thah=pepper, ccia=small	hilly/mountainous				
70	269730	seeds	cultivar		paddy irrigated			may have been introduced from somewhere such as China? soft, sticky	hilly/mountainous				
71	269731	seeds	landrace	cca ta, "madu"	shifting				hilly/mountainous				
72	269732	seeds	landrace	bia a sei paw					hilly/mountainous				
73	269733	seeds	landrace	ei ba leh					hilly/mountainous				
74	269734	seeds	landrace	hei pae	backyard			red fruits, eat with meat, bitter, Chin people eat regularly, "khayan khar thi"	hilly/mountainous				
75	269735	vegetative	landrace					bulbil	hilly/mountainous				
76	269736	seeds	landrace	ccaw				for food	hilly/mountainous				
77	269737	seeds	landrace					for brewing	hilly/mountainous				

Table 3. (Continued).

Col. No.*	JP No.	Scientific name	English name	Date YYYY/ MM/dd	Country	State/ Region	Township	Village name and/or nearest town/village	site/source	Way-point	Latitude (N)			Longitude (E)			Altitude
											º	′	"	º	′	"	m
78	269738	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	backyard	009	22	0	23	93	25	42	1,103
79	269739	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Hring Thang Khna	backyard	009	22	0	23	93	25	42	1,103
80	269740	*Hibiscus sabdariffa* L.	roselle	2/17/2019	Myanmar	Chin	Rezua	Retzua	backyard	010	22	2	54	93	24	46	1,303
81	269741	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
82	269742	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
83	269743	*Zea mays* L.	maize	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
84	269744	*Eleusine coracana* (L.) Gaertn. ssp. *coracana* Hilu et de Wet	finger millet	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
85	269745	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
86	269746	*Hibiscus sabdariffa* L.	roselle	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
87	269747	*Hibiscus sabdariffa* L.	roselle	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
88	269748	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
89	269749	*Cucurbita maxima* Duch.	pumpkin	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
90	269750	*Cucumis sativus* L.	cucumber	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
91	269751	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
92	269752	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
93	269753	*Zea mays* L.	maize	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
94	269754	*Benincasa hispida* Cogn.	ash gourd	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
95	269755	*Capsicum annuum* L.	chili pepper	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
96	269756	*Capsicum annuum* L.	chili pepper	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
97	269757	*Capsicum annuum* L.	chili pepper	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
98	269758	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
99	269759	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Sawti	farm storage	011	22	2	42	93	22	42	1,081
100	269760	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farmland	012	22	5	19	93	21	47	1,192
101	269761	*Cucurbita maxima* Duch.	pumpkin	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
102	269762	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
103	269763	*Glycine max* (L.) Merrill	soybean	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
104	269764	*Lagenaria siceraria* (Molina) Standl. var. *siceraria*	bottle gourd	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
105	269765	*Oryza sativa* L.	rice	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
106	269766	*Hibiscus sabdariffa* L.	roselle	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
107	269767	*Perilla frutescens* (L.) Britton var. *frutescens*	perilla	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
108	269768	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
109	269769	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
110	269770	*Cucumis sativus* L.	cucumber	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
111	269771	*Capsicum annuum* L.	chili pepper	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
112	269772	*Zea mays* L.	maize	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
113	269773	*Vigna unguiculata* (L.) Walp.	cowpea	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
114	269774	*Abelmoschus esculentus* (L.) Moench	okura	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
115	269775	*Curcuma longa* L.	turmeric	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
116	269776	*Curcuma amada* Roxburgh	mango ginger	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192

Table 3. (Continued).

Col. No.*	JP No.	Status	Status of plant sampled	Local plant name "local variety name"	Cultural practices	Sowing month	Harvest month	Other observations	Topography	Site	Stoniness	Soil texture	Drainage
78	269738	seeds	landrace		backyard				hilly/mountainous	slope			
79	269739	seeds	landrace		backyard			pod size is different from Col. No. 78	hilly/mountainous	slope			
80	269740	seeds	landrace		backyard				hilly/mountainous	slope			
81	269741	seeds	landrace	"madu"				upland rice	hilly/mountainous				
82	269742	seeds	landrace	"sa sha"				upland rice, slightly early and higher yield than "Madu"	hilly/mountainous				
83	269743	seeds	landrace	"ria ka"					hilly/mountainous				
84	269744	seeds	landrace	"sa syng"					hilly/mountainous				
85	269745	seeds	landrace	"daw ra"				eat alone, or with rice or maize	hilly/mountainous				
86	269746	seeds	landrace						hilly/mountainous				
87	269747	seeds	landrace						hilly/mountainous				
88	269748	seeds	landrace						hilly/mountainous				
89	269749	seeds	landrace						hilly/mountainous				
90	269750	seeds	landrace			Mar	Oct	large fruit, late maturing (other cucumber varieties are usually harvested in August).	hilly/mountainous				
91	269751	seeds	landrace						hilly/mountainous				
92	269752	seeds	landrace					given by a different farmer from Col. No. 91	hilly/mountainous				
93	269753	seeds	landrace						hilly/mountainous				
94	269754	seeds	landrace						hilly/mountainous				
95	269755	seeds	landrace	"be ei tha"				"Be" means Bama, "ei tha" means chilipepper	hilly/mountainous				
96	269756	seeds	landrace	"tha pi"					hilly/mountainous				
97	269757	seeds	landrace	"tha ria"					hilly/mountainous				
98	269758	seeds	landrace	"ba ta ma nung"				upland rice	hilly/mountainous				
99	269759	seeds	landrace	"cca ne"				upland rice, waxy	hilly/mountainous				
100	269760	seeds	landrace		shifting, backyard				hilly/mountainous				
101	269761	seeds	landrace						hilly/mountainous				
102	269762	seeds	landrace			Mar	Jun	eat alone, or with rice or maize, put grains into a pot where rice is being fully boiled	hilly/mountainous				
103	269763	seeds	landrace						hilly/mountainous				
104	269764	seeds	landrace	nanei bu thi	shifting, backyard				hilly/mountainous				
105	269765	seeds	landrace						hilly/mountainous				
106	269766	seeds	landrace						hilly/mountainous				
107	269767	seeds	landrace						hilly/mountainous				
108	269768	seeds	landrace						hilly/mountainous				
109	269769	seeds	landrace						hilly/mountainous				
110	269770	seeds	landrace						hilly/mountainous				
111	269771	seeds	landrace						hilly/mountainous				
112	269772	seeds	landrace						hilly/mountainous				
113	269773	seeds	landrace						hilly/mountainous				
114	269774	seeds	landrace						hilly/mountainous				
115	269775	seeds	landrace						hilly/mountainous				
116	269776	seeds	landrace						hilly/mountainous				

Table 3. (Continued).

Col. No.*	JP No.	Scientific name	English name	Date YYYY/ MM/dd	Country	State/ Region	Township	Village name and/or nearest town/village	site/source	Way-point	Latitude (N)			Longitude (E)			Altitude
											°	′	"	°	′	"	m
117	269777	*Solanum aethiopicum* L.	Ethiopian eggplant	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
118	269778	*Gossypium barbadense* L.	cotton	2/17/2019	Myanmar	Chin	Rezua	Long Thang Tlang	farm storage	012	22	5	19	93	21	47	1,192
119	269779	*Mucuna pruriens* DC. var. *utilis* (Wall. ex Wight) Baker ex Burck	velvet bean	2/18/2019	Myanmar	Chin	Rezua	Sha Shi	farm storage	013	22	7	1	93	31	1	834
120	269780	*Cucurbita maxima* Duch.	pumpkin	2/18/2019	Myanmar	Chin	Rezua	Ai Ka	farm storage	014	22	10	35	93	36	41	1,239
121	269781	*Zea mays* L.	maize	2/18/2019	Myanmar	Chin	Rezua	Ai Ka	farm storage	014	22	10	35	93	36	41	1,239
122	269782	*Hibiscus sabdariffa* L.	roselle	2/18/2019	Myanmar	Chin	Rezua	Ai Ka	farm storage	014	22	10	35	93	36	41	1,239
123	269783	*Oryza sativa* L.	rice	2/18/2019	Myanmar	Chin	Rezua	Ai Ka	farm storage	014	22	10	35	93	36	41	1,239
124	269784	*Solanum aethiopicum* L.	Ethiopian eggplant	2/18/2019	Myanmar	Chin	Rezua	Ai Ka	farmland	014	22	10	35	93	36	41	1,239
125	269785	*Ocimum basilicum* L.	basil	2/18/2019	Myanmar	Chin	Rezua	Ai Ka	farmland	014	22	10	35	93	36	41	1,239
126	269786	*Brassica oleracea* L. Group Acephala	kale	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farmland	016	22	46	8	93	34	7	1,584
127	269787	*Amaranthus tricolor* L.	edible amatanth	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farmland	016	22	46	8	93	34	7	1,584
128	269788	*Cucumis sativus* L.	cucumber	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
129	269789	*Cucurbita maxima* Duch.	pumpkin	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
130	269790	*Zea mays* L.	maize	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
131	269791	*Zea mays* L.	maize	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
132	269792	*Capsicum annuum* L.	chili pepper	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
133	269793	*Solanum aethiopicum* L.	Ethiopian eggplant	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
134	269794	*Ocimum basilicum* L.	basil	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farmland/farm storage	016	22	46	8	93	34	7	1,584
135	269795	*Zea mays* L.	maize	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
136	269796	*Vigna unguiculata* (L.) Walp.	cowpea	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
137	269797	*Psophocarpus tetragonolobus* (L.) DC.	winged bean	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
138	269798	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
139	269799	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
140	269800	*Momordica charantia* L. var. *abbreviata* Ser.	small bitter gourd	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farmland	016	22	46	8	93	34	7	1,584
141	269801	*Cucurbita maxima* Duch.	pumpkin	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
142	269802	*Solanum aethiopicum* L.	Ethiopian eggplant	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farmland	016	22	46	8	93	34	7	1,584
143	269803	*Pisum sativum* L.	garden pea	2/19/2019	Myanmar	Chin	Hakha	Chun Cung	farm storage	016	22	46	8	93	34	7	1,584
144	269804	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/19/2019	Myanmar	Chin	Hakha	Hniar Lawn	farm storage	017	22	41	43	93	36	28	1,638
145	269805	*Perilla frutescens* (L.) Britton var. *frutescens*	perilla	2/19/2019	Myanmar	Chin	Hakha	Hniar Lawn	farm storage	017	22	41	43	93	36	28	1,638
146	269806	*Oryza sativa* L.	rice	2/19/2019	Myanmar	Chin	Hakha	Hniar Lawn	farm storage	017	22	41	43	93	36	28	1,638
147	269807	*Zea mays* L.	maize	2/19/2019	Myanmar	Chin	Hakha	Hniar Lawn	farm storage	017	22	41	43	93	36	28	1,638
148	269808	*Zea mays* L.	maize	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
149	269809	*Oryza sativa* L.	rice	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
150	269810	*Cucumis sativus* L.	cucumber	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
151	269811	*Pisum sativum* L.	garden pea	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
152	269812	*Brassica oleracea* L. Group Acephala	kale	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
153	269813	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
154	269814	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696

Table 3. (Continued).

Col. No.*	JP No.	Status	Status of plant sampled	Local plant name "local variety name"	Cultural practices	Sowing month	Harvest month	Other observations	Topography	Site	Stoniness	Soil texture	Drainage
117	269777	seeds	landrace						hilly/mountainous				
118	269778	seeds	landrace						hilly/mountainous				
119	269779	seeds	landrace	khway la ya					hilly/mountainous				
120	269780	seeds	landrace		shifting	Mar/Apr	Sep		hilly/mountainous				
121	269781	seeds	landrace		shifting			shifting with fallowing of 10 to 15 years, sow after a week of burning	hilly/mountainous				
122	269782	seeds	landrace	mae khu	shifting, backyard			red colored	hilly/mountainous				
123	269783	seeds	landrace	ca teng	shifting	Mar	Nov	upland rice	hilly/mountainous				
124	269784	seeds	landrace	mae toe khar	backyard				hilly/mountainous				
125	269785	seeds	landrace	hang mae	shifting, backyard				hilly/mountainous				
126	269786	seeds	landrace		backyard				hilly/mountainous	slope	low	clay	moderate
127	269787	seeds	landrace	hin nu nwe	backyard			leaves are eaten	hilly/mountainous				
128	269788	seeds	landrace	zil	backyard				hilly/mountainous				
129	269789	seeds	landrace	mai	backyard				hilly/mountainous				
130	269790	seeds	landrace	kawn				white grain	hilly/mountainous				
131	269791	seeds	landrace	kawn				yellow grain	hilly/mountainous				
132	269792	seeds	landrace	hem pheak					hilly/mountainous				
133	269793	seeds	landrace	santok					hilly/mountainous				
134	269794	seeds	landrace	ham phe					hilly/mountainous	slope			
135	269795	seeds	landrace						hilly/mountainous				
136	269796	seeds	landrace						hilly/mountainous				
137	269797	seeds	landrace						hilly/mountainous				
138	269798	seeds	landrace						hilly/mountainous				
139	269799	seeds	landrace	pe tau					hilly/mountainous				
140	269800	seeds	landrace	an kha					hilly/mountainous				
141	269801	seeds	landrace	mai					hilly/mountainous				
142	269802	seeds	landrace	mai hrem					hilly/mountainous				
143	269803	seeds	landrace	khun sa					hilly/mountainous				
144	269804	seeds	landrace	fang	shifting	Mar	Sep		hilly/mountainous	slope			
145	269805	seeds	landrace		shifting	Mar	Sep		hilly/mountainous	slope			
146	269806	seeds	landrace	"japani"	paddy irrigated, trans-plant (June/July)	Apr	Nov		hilly/mountainous				
147	269807	seeds	landrace	fung vawi	shifting			boil to make porrige	hilly/mountainous				
148	269808	seeds	landrace	fung vawi	shifting	Mar	Sep/Oct		hilly/mountainous				
149	269809	seeds	landrace	fa cang, "japani"	paddy irrigated, trans-plant (June/July)	Apr	Nov		hilly/mountainous				
150	269810	seeds	landrace	zil		Mar/Apr			hilly/mountainous				
151	269811	seeds	landrace	sataw pe					hilly/mountainous				
152	269812	seeds	landrace						hilly/mountainous				
153	269813	seeds	landrace	bai lep					hilly/mountainous				
154	269814	seeds	landrace	bai lep, "manipuri"					hilly/mountainous				

Table 3. (Continued).

Col. No.*	JP No.	Scientific name	English name	Date YYYY/ MM/dd	Country	State/ Region	Township	Village name and/or nearest town/village	site/source	Way-point	Latitude (N)			Longitude (E)			Altitude
											°	′	"	°	′	"	m
155	269815	*Cucurbita maxima* Duch.	pumpkin	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
156	269816	*Cucurbita maxima* Duch.	pumpkin	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
157	269817	*Cucumis sativus* L.	cucumber	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
158	269818	*Daucus carota* L. subsp. *sativus* (Hoffm.) Arcang.	carot	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	018	22	33	54	93	35	16	1,696
159	269819	*Zea mays* L.	maize	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	019	22	34	15	93	35	21	1,714
160	269820	*Vicia faba* L.	broad bean	2/19/2019	Myanmar	Chin	Hakha	Loklung	farm storage	019	22	34	15	93	35	21	1,714
161	269821	*Miscanthus nepalensis* (Trinius) Hackel ?	miscanthus grass	2/20/2019	Myanmar	Chin	Hakha	Zokhua	wild	020	22	31	58	93	41	28	1,365
162	269822	*Momordica charantia* L. var. *abbreviata* Ser.	small bitter gourd	2/20/2019	Myanmar	Sagaing	Pale	Tha Pyay Gone	farmland	021	21	55	41	94	43	56	129
163	269823	*Ocimum basilicum* L.	basil	2/20/2019	Myanmar	Sagaing	Pale	Tha Pyay Gone	farmland	021	21	55	41	94	43	56	129
164	269824	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
165	269825	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
166	269826	*Brassica juncea* (L.) Czern. Group Cernua	leaf mustard	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
167	269827	*Coriandrum sativum* L.	coriander	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
168	269828	*Hibiscus sabdariffa* L.	roselle	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
169	269829	*Vigna umbellata* (Thunb.) Ohwi et Ohashi	rice bean	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
170	269830	*Glycine max* (L.) Merrill	soy bean	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
171	269831	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
172	269832	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
173	269833	*Phaseolus vulgaris* L.	common bean	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
174	269834	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
175	269835	*Setaria italica* (L.) P. Beauv. ssp. *italica*	foxtail millet	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
176	269836	*Perilla frutescens* (L.) Britton var. *frutescens*	perilla	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
177	269837	*Sesamum indicum* L.	sesame	2/19/2019	Myanmar	Chin	Hakha	Hakha	marketplace	015	22	38	27	93	36	13	1,726
178	269838	*Coccinia grandis* (L.) Voigt	ivy gourd	2/22/2019	Myanmar	Naypyidaw Union Territory	Pyinmana	Yezin	wild	022	19	49	39	96	16	30	55

Note: * Each collection is designated as COL/MYANMAR/FEB2019/NARO-DAR/“Col. No.”

Table 3. (Continued).

Col. No.*	JP No.	Status	Status of plant sampled	Local plant name "local variety name"	Cultural practices	Sowing month	Harvest month	Other observations	Topography	Site	Stoniness	Soil texture	Drainage
155	269815	seeds	landrace	kala mai	shifting, backyard			large seed, Jndian pumpkin	hilly/mountainous				
156	269816	seeds	landrace	chin mai	shifting, backyard			small seed	hilly/mountainous				
157	269817	seeds	landrace	zil	shifting, backyard				hilly/mountainous				
158	269818	seeds	landrace		backyard			purchased at Haka, maybe local or introduced, becomes smaller after cultivations	hilly/mountainous				
159	269819	seeds	landrace	fung vawi	shifting, backyard				hilly/mountainous				
160	269820	seeds	landrace	sasaha					hilly/mountainous				
161	269821	seeds	wild					roadside	hilly				
162	269822	seeds	landrace	kyet hin khar thi	backyard			Burmese landrace	plain level				
163	269823	seeds	landrace	pin sein	backyard				plain level				
164	269824	seeds	landrace					dehusked grains sold at marketplace	hilly				
165	269825	seeds	landrace					sold at marketplace	hilly				
166	269826	seeds	landrace					sold at marketplace	hilly				
167	269827	seeds	landrace					sold at marketplace	hilly				
168	269828	seeds	landrace	chin baung				sold at marketplace	hilly				
169	269829	seeds	landrace					sold at marketplace	hilly				
170	269830	seeds	landrace					sold at marketplace	hilly				
171	269831	seeds	landrace					sold at marketplace	hilly				
172	269832	seeds	landrace					sold at marketplace	hilly				
173	269833	seeds	landrace					sold at marketplace	hilly				
174	269834	seeds	landrace					dehusked grains sold at marketplace, non-waxy	hilly				
175	269835	seeds	landrace					dehusked grains sold at marketplace, waxy	hilly				
176	269836	seeds	landrace					sold at marketplace	hilly				
177	269837	seeds	landrace					sold at marketplace	hilly				
178	269838	seeds	weed	khin mon thi				on a bush at the roadside	plain level	slope	medium	sandy clay	moderate

Note: * Each collection is designated as COL/MYANMAR/FEB2019/NARO-DAR/“Col. No.”

Table 4. Vernacular crop names obtained from interviews with the locals

				cf.*		cf.*		
		time	Feb. 2019	Nov. 2018	Feb. 2019	Nov. 2018	Feb. 2019	Feb. 2019
		township (No. of sites)	Mindat (1)	Mindat (1)	Madupi (2)	Madupi(4)	Rezua (5)	Hakha (3)
		district	Mindat	Mindat	Madupi	Madupi	Madupi	Hakha
		country	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar
		waypoint	002	(2017) 158	004 & 005	2017 (170, 171, 173, & 175)	007, 008, 011, 012 & 014	016. 017 & 018
Latin name	English name	common Bama crop name						
Oryza sativa L.	rice	*saba* *dehusked: san* *cooked: htamin*	*santang*	*than ghu*	*cang* [sɑŋ]	*cang* [sɑŋ] *chang* *chaan*	*ccata* *ca teng* *cca cuo*	*fa cang* *fang*
Zea mays L.	maize	*pyoung bu*	*vai pung*	*pun pho*	*cang kum* *cang gun*	*cang kuem* [sɑŋ kuem] *vai kum* *vakum* *vi kym*	*phaw wi* *phaw woi* *thaw voi* *chua vi*	*fung vawi* *kawm*
Eleucine coracana (L.) Gaertn.	finger millet	*sat ni*	*san tung*	*thau shen*	*mail ket*	*mel kep* *mal kat* *mal ket* *cang tyn*	*cca syn* *ccah syn* *ccasyn* [sɑ.săŋ] *ca sung* *ca syng* (sa sung)	
Setaria italica (L.) P. Beauv.	foxtail millet	*sat*	-	*than*	*cat tul* *cang tul*	*cang tul* *cang tyn* *vui lawng* *hulo*	*ccaw* *ca tung* *caw*	*fang* *fang hum*
Glycine max (L.) Merrill	soybean	*pe bouk*	-	*sham bai*	-	*sam phai* *cam phai*	*ebaleh* *ba rung* *ba rung thuk* *be raung*	*pa hrum thu* *ba hrum* *pe poh* (like Bama)
Vigna umbellata (Thunb.) Ohwi & Ohashi	rice bean	*chin pe,* *taung ya pe*	*bei*	*be tha*	*kasi*	*be chik* *ka cik* *mai cik* *mai dawn*	*lung dawi* *bia* *khu khu*	*be* *sawm pi*
Psophocarpus tetragonolobus (L.) DC.	winged bean	*pe zaung ya*	-	*pe shon she*	*pui kla neng* *pa let thai*	*pui hla nay* *pe* *cha nar* *pe zaung ya* (as Bama)	*pe sung* *pe saung ya* *pe saung ti* (like Bama)	*pe saung* (like Bama)
Vigna unguiculata (L.) Walpers	cowpea/yard-long bean	*pe lun*	-	*ma rui*	*mi dawng* *mador thai*	*mai dawn* *mi dawl*	*long due* *lung dui* *pe taung si* (as Bama)	*pe sau*
Lablab purpureus (L.) Sweet	lablab bean	*pegyi*	*kikrea*	*ma kei shin*	*ki rentai* *kharei thai*	*khawi pe* *khawi re* *khi rae*	*ebaleh* *ei ba leh* *igbaleh* *a bia* *beng tia*	*bai lep* *thal bai lep*

Table 4. (Continued).

				cf.*		cf.*		
		time	Feb. 2019	Nov. 2018	Feb. 2019	Nov. 2018	Feb. 2019	Feb. 2019
		township (No. of sites)	Mindat (1)	Mindat (1)	Madupi (2)	Madupi(4)	Rezua (5)	Hakha (3)
		district	Mindat	Mindat	Madupi	Madupi	Madupi	Hakha
		country	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar
		waypoint	002	(2017) 158	004 & 005	2017 (170, 171, 173, & 175)	007, 008, 011, 012 & 014	016. 017 & 018
Latin name	English name	common Bama crop name						
Canavalia gladiata (Jacq.) DC.	sword bean	*pe dalet*	-		*ki rawng*	*kha rawk* *khi rawk* *rawk*	*cca haw* *sahaa* *sang haw*	-
Amaranthus spp. (collective)	amaranth	*hin nu nwe*	*an uop*	*bwe an*	*om al*	*an dung* *op al*	*hin nuh noi* *hin nu nwe* (as Bama)	*chaw hnawn* *hin nu nawi* (like Bama)
Sesamum indicum L.	sesame	*hnan*	-	*khie*	*sa pen* *sat peh*	*ta pleh* *ta pert* *tipe* *za pae*	*chih hua* *chi hya* *chya hria* *thi hya*	*chi hria*
Hibiscus cannabinus L.	kenaf	*chin banung*	*tur an*	*twi an*	*mi pung al* *mei pung al*	*mai pu* *mi puh* *an thwi*	*mae khu* *mae khu ara* *you mae khu* *hmia khu ruo paa*	*an thur*
Hibiscus sabdariffa L.	roselle	*chin baung ni*	*tur an*	*twi then*	*mi pung al* *ni bung al*	*mai pu* *moi thu* *toem al*	*mae khu* *mae khu asi* *hmia khu sepaa*	*an thur*
Momordica charantia L.	bitter gourd	*kyet hin khar*	-	*akka tha*	*kha tai* *khar thai*	*cang kha* *jan ka* *an ca rah*	*se hin kha* *kyet hin khar* (as Bama)	*an fang kha* *an kha*
Amorphophallus spp.	elephant foot yam	*wa u*	*jon val*	*ngen tha*	*kang bal* *bak thai*	*thlawng bal* *thawl bal* *kham bal* *pa tai*	*aa u* *aa oun* *a yng* *cia doh*	*tawl re baa* *tawl re ba* *taw raung*
Musa spp.	banana	*hnget pyaw*	*phang si*	*pain shi*	*di ke tai* *di ki thai*	*ding kay thaih* *ding kil* *ding ki* *hom hin*	*be law* *buo hla*	*ban hla*
Perilla frutescens Britton var. *frutescens*	perilla	*shan hnan*	*thang si*	*khwo kie*	*tang ti* *tat ti*	*thang thi* *tang thi*	*a chi* *chi pi* *thi pii*	*chi*
Centella asiatica (L.) Urban	Asiatic pennywort	*myin khwa*	*minkwa* (like Bama)	*myin khwa* (as Bama)	*minkwa ywe* (as Bama)	*ha ver ram* *ha veel* *myin khwa* (as Bama) *myin kwa* (like Bama)	*min khwa ywe* (as Bama) *mi khua naw*	*rang tum belh*

Table 4. (Continued).

				cf.*		cf.*		
		time	Feb. 2019	Nov. 2018	Feb. 2019	Nov. 2018	Feb. 2019	Feb. 2019
		township (No. of sites)	Mindat (1)	Mindat (1)	Madupi (2)	Madupi(4)	Rezua (5)	Hakha (3)
		district	Mindat	Mindat	Madupi	Madupi	Madupi	Hakha
		country	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar
		waypoint	002	(2017) 158	004 & 005	2017 (170, 171, 173, & 175)	007, 008, 011, 012 & 014	016. 017 & 018
Latin name	English name	common Bama crop name						
Allium tuberosum Bottl. ex Spreng.	Chinese chive	*kyet thun meik*	*kashuan*	*thu tien hao*	*bi rung noang* *gasor nor*	*sawn thim ram* *saw thim a hah* *sawn thim* *ba run hnawl*	*sun seng naw* *sun see naw* *sun see paw* *pie sya*	*chuan aung* *piat* (like Hindi)
Allium cepa L. Aggregatum Group	shallot	*kyet thun ni*	*kashuan lin*	*thu tien*	*birung* *brung*	*sawn thim* *saw thim* *ba run*	*sun seng baw* *sun se paw* *sun see* *pie sya*	*piat* (like Hindi)
Allium chinense G.Don.	Chinese onion	*kyet thun ni*	*kashuan lin*	*thu bou*	*gasor bu*	*yueng al*	*sun se paw* *sun raw*	*piat* (like Hindi)
Allium sativum L.	garlic	*kyet thun phyu*	*kashuan vuok*	*thu bou*	*ran saw* *gasor bu*	*sawn bawk* *saw bo* *ka sawl bok*	*sun raw* *sim raw* *sur raw paw* *kha chung*	*khia chuang rang* *kha chuan rong* *kha chuan*
Coriandrum sativum L.	coriander	*nan nan*	*nan nan* (as Bama)	*nan nan* (as Bama)	*ma sin al* *nan nan* (as Bama)	*sawng sing* *saung sing* *song sing* *mang sing*	*nain nain* *nan nan* (as Bama) *nan nan ywe* (as Bama)	*nan nan* (as Bama)
Oenanthe javanica (Blume) DC.	Chinese celery	*shan nan nan*	*kala nan nan* (like Bama)		*tayo nan nan* (as Bama) *nan nan* (as Bama)	*sawng sing* *saung sing* *nan nan*	*celeri* (as English) *selari* (like English) *selarih* (like English) *zaleri* (like English)	*caleri* (as English)
Eryngium foetidum L.	Mexican coriandar	*kala nan nan*	*shan nan nan* (like Bama)	*pak nan*	*nang al* *sam mhon al*	*ma hawk* *ma hawh* *mo hok* *hnawk al*	*ma ho* *khang muin*	*an kha hmui* *khamh phe* *kham phe*
Mentha spp. (probably *M. arvensis*)	mint (probably corn mint)	*pusi nan*	*pu si nan* (as Bama)	*pusi nan* (as Bama)	*pu si nan* (as Bama)	*pusi nan* (as Bama) *po ti nal al*	*pu si nan (as Bama)* *pu zi nan* (like Bama) *posi nan* (like Bama) *bu ti*	*putinan* (like Mizo)
Neptunia oleracea LOUR.	water mimosa	*sit pok*	-	*ghom kam*	*neel al* *nul al*	*ham lyn* *han lyn* *hlin an* *nuel al*	*ruh cceh* *ruh cceuh* *rui ccih* *cia run kha* *sue poke* (like Bama)	*soe pot* (like Bama)

Table 4. (Continued).

				cf.*		cf.*		
		time	Feb. 2019	Nov. 2018	Feb. 2019	Nov. 2018	Feb. 2019	Feb. 2019
		township (No. of sites)	Mindat (1)	Mindat (1)	Madupi (2)	Madupi(4)	Rezua (5)	Hakha (3)
		district	Mindat	Mindat	Madupi	Madupi	Madupi	Hakha
		country	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar
		waypoint	002	(2017) 158	004 & 005	2017 (170, 171, 173, & 175)	007, 008, 011, 012 & 014	016. 017 & 018
Latin name	English name	common Bama crop name						
Elsholtzia blanda Benth.	elsholtzia basil	*pin zein*	*shon kung*	*mak tong gu*	*cang kuel al* *skun koi*	*sung ii* *sumg ii* *cang kueng koi* *bai bum*	*sun kun* *ha mae* *matu ha mae*	*khamh hmaui* *hamh hmaui*
Ocimum spp. (collective)	basil	*lum* *kala pinzein*	*sun luk*	*tong gu*	*cang ring* *sahu al*	*cang ruck* *cyng ryk* *cyn ryk* *an jing ngu*	*ha mae* *hang mae* *hrua hmia*	*lai khamh hmaui* *khomh hmaui* *hamh hmaui*
Solanum violaceum Ortega	Indian nightshade	*khayan khazaw*	*ren phua*	*ka hun kar*	*paing tai* *paing thai*	*am phai* *an phai kha* *an phai ca* *dai ha*	*hoypae* *hin pae* *hey pae* *ua vuo*	*khomh hmaui* *hmai hrem* *hrem te*
Solanum torvum Swartz.	Devil's fiq	*khayan gyin*	*ren phua*	*muei ka hun*	*bal lak tai* *paing thai*	*an phai* *an phai bur* *ba lok thaih*	*zuapawhey pae* *yopo hey pae* *hin pae* *a na ua veo*	*na hmai hrem* *hmai hrem*
Chenopodium bengalense (Lam.) Spielm. ex Steud.	tree spinach		*ting ho*	*kim nu*	*ti hoe koe* *ta hue koi*	*ting hu* *ting hou kawi* *ti hoe* *ti hu* *jim bu*	*hoypae* *huh*	-
Colocasia spp. (mostly *C. esculenta* (L.) Schott)	taro	*pein u*	*val*	*bar*	*bal*	*bal* *bai*	*bah tah* *bata* *sa sa*	*ba*
Dioscorea spp. (mostly *D. alata)*	yam	*myauk u*	*tuum* [tūm]	*har*	*ba ra* *tung tai*	*phym* *plum* *bal ha* *thuem* (aerial bulbil)	*ba lu* *ba lu paa* *balo* *ba haw*	*ba hra* *maut uh*
Manihot esculenta Crantz	cassava	*palau pinau u pin*	-	*shin har*	*thing vi ha* *thing wa ha*	*pang bal* *sapang bal* *me lan khar*	*thing vae baw*	*thing kaw hra* *thin ba hra*
Capsicum spp. (mainly *C. annuum* L. but incl. *C. chinense* & *C. frutescens*)	chili pepper	*ngayok*	*shang pua*	*mishi,* *kataki mish* (specially hot)	*krueng taih* *hut thai*	*r<trl>ut thaih,* *r<trl>ut paw* (specially hot) *ruth* *ruuk taih* *san pho*	*e thah* *ei thah* *eng thah* *ua hia*	*hmon pheck* *hmam phek* *hmek phek*

Table 4. (Continued).

				cf.*		cf.*		
		time	Feb. 2019	Nov. 2018	Feb. 2019	Nov. 2018	Feb. 2019	Feb. 2019
		township (No. of sites)	Mindat (1)	Mindat (1)	Madupi (2)	Madupi(4)	Rezua (5)	Hakha (3)
		district	Mindat	Mindat	Madupi	Madupi	Madupi	Hakha
		country	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar	Myanmar
		waypoint	002	(2017) 158	004 & 005	2017 (170, 171, 173, & 175)	007, 008, 011, 012 & 014	016. 017 & 018
Latin name	English name	common Bama crop name						
Solanum lycopersicon L.	tomato	*khayan gyin*	*khayan chyin*	*bu but twee*	*khayan chin* *khayan chin thai*	*khayar gyin* (as Bama) *al mae*	*kha zan chinti* *khayan chin* (like Bama) *phah zeng khing* *mae toe khar* (for *S. aegyptica*)	*ka yan chin* (like Bama) *ka yan chin ti* (like Bama)
Solanum melongena L.	eggplant	*khayan* *khayan thi*	-	*bu bun*	*ti poeng tai* *ta pu thai*	*tam poe thaih* *pen touh thaih* *pen tuk* *pan dou* *khayan kha* (round one, as Bama)	*mae ty* *mae tou* *mae toe* *ba bua*	*bom bok* *san tok*
Cucurbita spp. (mosly *C. maxima* Duch. ex Lam.)	pumpkin	*hpayon*	*puph*	*nmai*	*phoe tai* *pu thai*	*phoeh thaih* *phouh* *phou* *phut*	*mae* *mae e* *mae ma* *ma maw*	*mai*
Benincasa hispida (Thunb.) Cogn.	ash gourd	*kyauk hpayon*	*am mai*	*umaime*	*al mai taih* *mai thai*	*al mai thaih* *an mai thaih* *an mai* *mai*	*mae hing* *mae raw* *thla hmia*	*mai run*
Lagenaria siceraria (Molina) Standl.	bottle gourd	*bu* *bu thi*	*tui pung*	*up twee* *up kar* (to make bottle)	*tai taih* *tui thai*	*tui thaih* *dui thai*	*ae tui aung* *ae bo cui aung* *chui aung* *un thi* *bu thi* (as Bama)	*bu ti* (like Bama) *ti lhawl*
Ethnic group			Bwe Hone Chin people	(Chin people)	Matu Chin people	(Chin people)	Zo Tung Chin people Lu Tuv Chin people	Hlawn Ceu Chin people Thang Lian Chin people Sang Te Chin people Zaa Thang Chin peoples
note		*u* means root *thi (dhi)* means fruit *ywe* means leaf					*cc* [s], *y* [ă]	

*cf.: vernacular names collected in Chin State in November 2017