

原著論文

## ミャンマー北部における伝統的作物の調査と収集 (2) (2009 年)

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## Second Field Survey Collecting Traditionally Grown Crops in Northern Areas of Myanmar, 2009

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### Summary

We made the second joint field survey in Kachin state of Myanmar in October, 2009 after the first survey in October, 2006. The field survey team was organized by Tsukuba University (TU), Japan, the National Institute of Agrobiological Sciences (NIAS), Japan, and the Myanma Agricultural Service (MAS), Myanmar. The survey was funded by a Grand-in-Aid for Overseas Scientific Research of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan (Research Project No. 21405017, 2009-2011). This country has been suggested to harbor crop genetic diversity in traditional cultivated plants and their wild relatives. There was, however, a little information on crops diversity and distribution, since a limited number of field studies in relation had been organized: by IRRI in early 1990s, by JICA Seed Bank Project during 1997 to 2002, by NIAS Genebank Project from 1999 to 2005, and our previous survey in 2006.

We surveyed northwards from Myitkyina up to Hka-Ga-Ran-Yang village located 57 miles

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south of Sumprabum, and then retreated to Myitkyina. It was expected difficult to proceed in a muddy road in rainy season in Kachin state. To make matters worse, the botanical trip was highly disturbed by the heavy rain caused by Typhoon No. 17 (PARMA). Consequently, we could survey some areas only less than 620 m altitude above the sea level and collected 39 plant samples including rice landraces (13 samples), sesame (5) and rice bean (2).

## Introduction

Recent field studies on plant genetic resources for food and agriculture (PGRFA) in Myanmar have suggested that genetic diversity of traditionally utilized plants is well preserved there (Uga *et al.*, 2005; Uga *et al.*, 2006; Saito *et al.*, 2006, and Watanabe *et al.*, 2007). Myanmar harbors genetic diversity of wild and cultivated rice as well as several other cultivated plants. Systematic field survey and collection of PGRFA have, however, not been so intensively organized there.

We planned and carried out the second joint field survey in Kachin state of Myanmar in October, 2009 as a team organized by Tsukuba University (TU), Japan, National Institute of Agrobiological Sciences (NIAS), Japan and the Myanma Agricultural Service (MAS), Myanmar to collect landraces of upland rice, small millets, pulses, ginger and turmeric in the areas that are not well studied during the first survey organized in October, 2006. We surveyed the northern part of Kachin state including the basin surrounding Putao and hilly areas from Putao to Sumprabum in 2006 (Watanabe *et al.*, 2007). Then, we focused on hilly areas between Myitkyina and Sumprabum this time.

This field study was planned and carried out as a part of a Grant-in-Aid Program for Overseas Academic Survey of Basic Research Type B (code No. 21405017, Program Leader: Prof. Dr. Kazuo Watanabe, Tsukuba University) financially supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan, and partly supported by a research grant from Heiwa Nakajima Foundation.

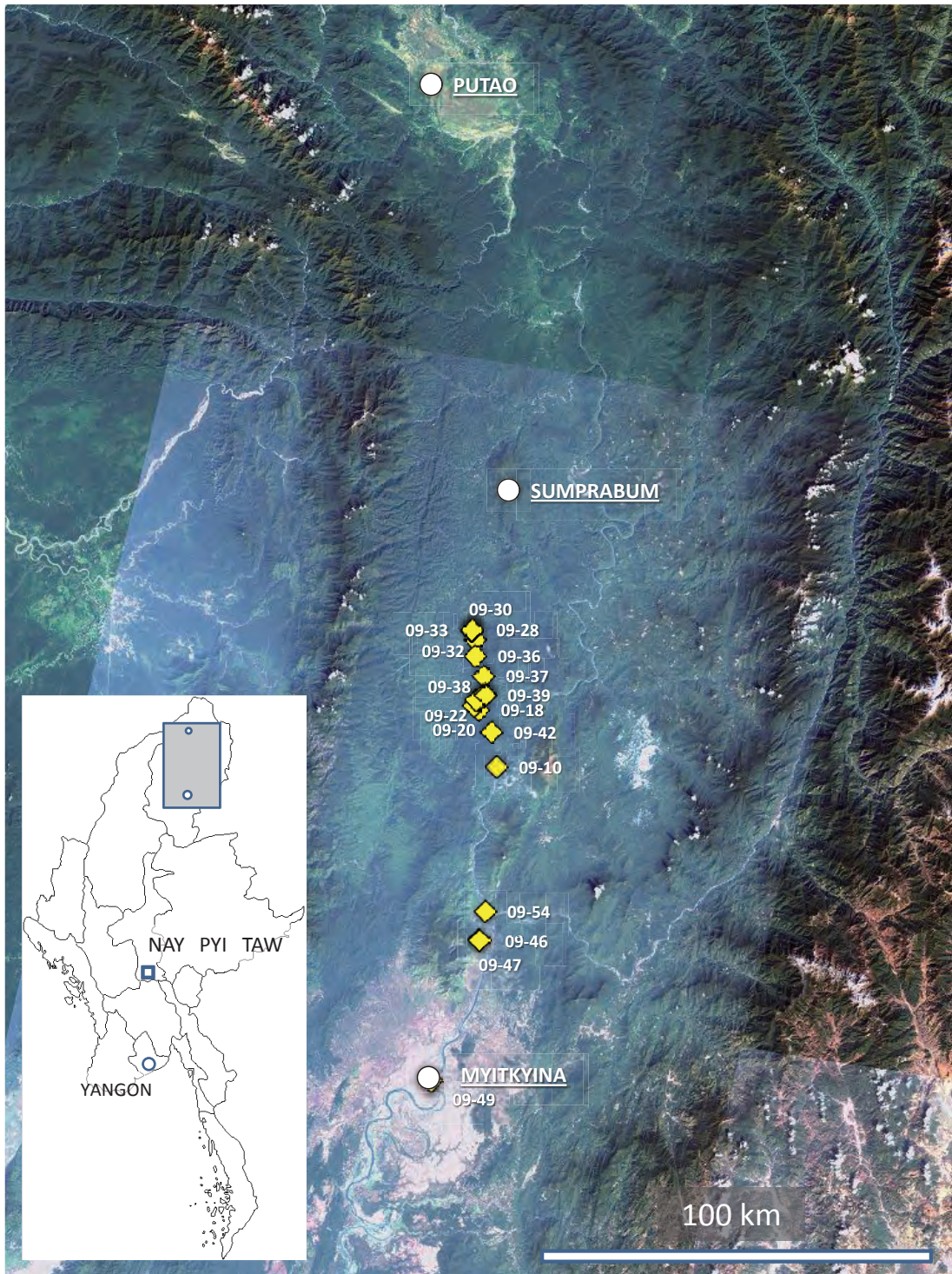


Fig. 1. Collection sites (waypoints) in Kachin state of Myanmar in 2009. Landsat images data were obtained from the Earth Science Data Interface (ESDI) at Global Land Cover Facility (GLCF) at University of Maryland (<http://glcfapp.glcg.umd.edu:8080/esdi/index.jsp>) and processed with a landscape navigator software, Kashmir 3D (<http://www.kashmir3d.com/>).



Table 1. Itinerary of the field study in Kachin state of Myanmar in 2009.

Date	Itinerary	Stay	Places and activities
7 Oct Wed	arriving at YANGON	YANGON	All the member joined. Preparation meeting. Courtesy call to EOJ <sup>1)</sup> .
8 Oct Thu	W9-255 YGN — MYT MYITKYINA — TIAN-ZUP (4X4)	TIAN-ZUP	visit MAS <sup>2)</sup> Kachin State Manager Office. Field study along the route from MYITKYINA
9 Oct Fri	TIAN-ZUP — Construction Camp (4X4)	Construction Camp	field study along the route
10 Oct Sat	Construction Camp — THING-BAY (4X4)	THING-BAY	field study along the route
11 Oct Sun	THING-BAY — HKA-GA-RAN-YANG — DA-RU-KHA (4X4)	DA-RU-KHA	field study along the route
12 Oct Mon	DA-RU-KHA — MYITKYINA (4X4)	MYITKYINA	field study along the route
13 Oct Tue	MYITKYINA — MYIT-SONE — MYITKYINA (4X4)	MYITKYINA	field study along the route
14 Oct Wed	MYITKYINA	MYITKYINA	field study at and around MYITKYINA. tidy up collection
15 Oct Thu	W9-256 MYT — MDY <sup>3)</sup> MANDALEY — YEZIN (car)	YEZIN	courtesy visit to DAR <sup>4)</sup> HQs
16 Oct Fri	YEZIN — NAY-PYI-TAW — YEZIN (car)	YEZIN	courtesy visit to DAP <sup>5)</sup> HQs and MAS HQs tidy up collection
17 Oct Sat	YEZIN — YANGON (car)	YANGON	tidy up collection
18 Oct Sun	W9-256 MYT — MDY MANDALEY — YEZIN (car)	YANGON	quarantine
19 Oct Mon	YEZIN — NAY-PYI-TAW — YEZIN (car)	YANGON	courtesy visit to EOJ and JMO <sup>6)</sup>
20 Oct Tue	leaving YANGON		

1) Embassy of Japan at YANGON

2) Myanma Agriculture Service, Ministry of Agriculture and Irrigation

3) Watanabe and Wunna flew to YANGON

4) Department of Agricultural Research, Ministry of Agriculture and Irrigation

5) Department of Agricultural Planning, Ministry of Agriculture and Irrigation

6) JICA Myanmar Office at YANGON

## Exploration Methods

We had flown from Yangon to Myitkyina, the capital of Kachin state. Starting northwards from Myitkyina we surveyed the areas up to Hka-Ga-Ran-Yang village located 57 miles south of Sumprabum, and then retreated to Myitkyina. The traveling route and collection sites are shown in Fig.1. Our botanical trip was highly disturbed with muddy road conditions due to the rain caused by Typhoon No. 17 (PARMA).

We tried to find indigenous landraces traditionally grown there of rice, millets, pulses, and vegetables during the field survey. Visiting several villages, we interviewed villagers to realize what kinds of crops they grew, their cultivation practices and utilization. We focused on cereals like rice landraces (mainly upland rice varieties), sorghum, foxtail millet and finger millet, leguminous crops containing *Vigna* species, indigenous vegetables such as turmeric and ginger. When we collected plant materials, we also noted the geographical location of the collection sites based on GPS and the ecological information of the circumferences together with local people's knowledge on the cultivation practices and utilization of the plants.

The collected materials were divided into two subsets: one for Myanmar and another for

Japan. The former subset for Myanmar is preserved at the Seed Bank of DAR, some samples of which are conserved duplicated by MAS. The latter one was introduced into Japan with the Standard Material Transfer Agreement (SMTA) of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) also in accordance with quarantine rules of the both countries. Collected rice grains were dehusked before introduced to Japan. The ginger and turmeric samples are temporally stored at Tsukuba University, while others are conserved at the Genetic Resources Center, NIAS (NIAS Genebank) in Japan. Those materials are to be characterized and evaluated, and to be used for research and development.

## Results and Discussion

### *Observation and Collection*

We planned a survey of traditional crops in areas from Myitkyina up to Sumprabum, since we had surveyed around Putao and had observed the areas from Putao to Sumprabum in northern Kachin state in 2006. Unfortunately, muddy road conditions due to heavy rainfall, which also caused some troubles in our 4x4 vehicle, made our progress very slow and difficult. Then, we could not reach Sumprabum in a limited schedule but visited several villages in areas from Myitkyina to Hka-Ga-Ran-Yang at 57 miles before Sumprabum. At Hka-Ga-Ran-Yang, we decided to retreat to Myitkyina without reaching Sumprabum. Consequently, we could survey some areas less than 620 m alt. from sea level. Higher areas near Sumprabum should be surveyed in the next time hopefully.

The survey was done about a month earlier than the previous survey in 2006, we could see many stand crops in the "*Taung-ya*" (slash-and-burn) cultivation fields. Local upland rice varieties are predominantly grown in all *taung-ya* observed. *Taung-ya* cultivation is an efficient agricultural system with low input for communities with low population density in mountainous areas. Rice is mix-cropped with sesame, pumpkin, melon, bitter guard, ginger, rice bean, and so on. Compared with Putao and vicinity, foxtail millet, finger millet, and sorghum are rather rarely grown. In hilly areas lower than 200 m alt. of Myitkyina township *taung-ya* system and terraced paddy fields are often coexisting.

Consequently, we could survey some areas of lower than 620 m from the sea level and collected 41 plant samples including rice landraces (13 samples), sesame (5) and rice bean (2) as listed in Table 2.

### *Crop species diversity observed in fields*

Myitkyina is the capital of Kachin state. It is located on the bank of the Ayeyarwaddy River and its altitude is approximately 150 m. There is a plain suited for rice paddy cultivation in the south, while there are hilly and mountainous areas in the north and in the east. Various crops such as vegetables, spices, pulses and fruits are transported to Myitkyina from surrounding areas and sold at the marketplace (Photo 1). People trading at the marketplace informed us that different crops are grown on *taung-ya* fields in the mountains.

Near Myitkyina, rice is predominantly grown on both terraced paddy fields and *taung-ya* fields (less than 200 m altitude), for example, at Kyan-Khran village in hilly areas (Photo 2). On the other hand, upland rice (*taung-ya saba*) was grown on a steep *taung-ya* fields (Photo 3),

where various crops were grown admixed with rice at Da-Ru-Hka, Karan-Yang Mare and Thing-Bay Mare, which were located in the mountains at 251 m, 339 m and 593 m above sea level, respectively.

A large number of crops are grown in slash and burn cultivation fields called *taung-ya* that means “mountain cultivation field”. Having visited *taung-ya* fields, we perceived that they mostly depend on agricultural plants grown there. There were glutinous and non-glutinous rice, maize, sesame, rice bean, ginger, turmeric, bitter gourd, egg plant, roselle, taro, yam, chili pepper, pumpkin, and others.

There are many traditional rice landraces that local farmers recognized separately. In addition to foods, they are also used to brew a rice wine, which is sometimes distilled into liquor.

#### *Future subject*

Climatic conditions in Kachin state are wet and temperate, which are different from the central and southern parts of Myanmar. This wet condition enables rice production on steep sloping fields but impedes our field survey. We could survey only limited areas of Kachin state -several villages around Putao and a few villages near Sumprabum in 2006, and villages located in between Myitkyina and Sumprabum in 2009. We will have to survey the remaining areas between Putao and Myitkyina, particularly around Sumprabum.

#### Acknowledgements

Many people in both the Union of Myanmar and Japan supported this exploration and their help is very much appreciated. In particular, U Tin Htut Oo, Director General, Department of Agricultural Planning (DAP), Ministry of Agriculture and Irrigation (MOAI), Dr. Toe Aung, Director General, Department of Agricultural Research (DAR), MOAI, U John Ba Maw, Deputy Director General, DAR, MOAI, and U Ohn Than, Managing Director, Myanma Agriculture Service (MAS), MOAI facilitated greatly from planning to implementation.

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## Reference

1. Saito T, Matsumoto M, Than Htan Htaik, San San Yi (2006) Collaborative Exploration of Vegetables Genetic Resources in Myanmar, 2005. Ann. Rep. Exp. Intr. Plant Gen. Res. (植探報) 22: 115-133.
2. Uga Y, Tin Maw Oo, Win Twa, Kawase M (2005) Exploration and Collection of Wild Rice in Northern and Western Region of Myanmar, 2004. Ann. Rep. Exp. Intr. Plant Gen. Res. (植探報) 21: 117-133.
3. Uga Y, Than Sein, Kawase M (2006) Exploration and Collection of Wild Rice in Northwestern and Southeastern Regions of Myanmar, 2005. Ann. Rep. Exp. Intr. Plant Gen. Res. (植探報) 22: 63-77.
4. Watanabe K, Ye Tin Tun, Kawase M (2007) Field Survey and Collection of Traditionally Grown Crops in Northern Areas of Myanmar, 2006. Ann. Rep. Exp. Intr. Plant Gen. Res. (植探報) 23: 161-175.

## 和文摘要

ミャンマーは栽培稲や野生稲、そして多くの栽培植物の遺伝的多様性を有していると云われ、1990年代初頭にはIRRIによって、1997年から2002年にかけてはJICAシードバンク計画によって、また、1999年から2005年にかけては農業生物ジーンバンク事業によって探索収集が行われた。しかし、組織的な植物遺伝資源のフィールド調査や収集は必ずしも十分とはいえない。2006年の前回に引き続き、筑波大学、農業生物資源研究所およびミャンマー農業灌漑省との協力のもとカチン州において雑穀、マメ類、ショウガ、ウコン遺伝資源の調査と収集を行った。本現地調査研究は文部科学省科学研究費助成 基盤研究 (B) 課題番号 21405017「国境を超越して生存する少数民族に関わる絶滅危惧植物遺伝資源と伝統知識の保全」代表者 渡邊 和男)によるものである。雨季のため困難はある程度予想はしていたが、台風の影響によって四駆車といえども泥濘の中を進むことはきわめて困難で、計画したスンプラボンに至ることなく撤退を余儀なくされたが、カチン州のミッチーナ以北の標高620m未満の地域を調査し、収穫直後あるいは直前の焼畑を見ることができ、遺伝資源39点を収集した。収集品には栽培稲13点、ゴマ5点、タケアズキ (ツルアズキ) 2点などが含まれる。

Table 2. A list of plant materials collected in Kachin state of Myanmar in 2009

Sr. No.*	JP No.	Local variety name	English name	Scientific name	Date MM/DD	Country	State	Township	Village name and/or nearest town/village	Latitude				Longitude				Altitude m
										°	'	"	N	°	'	"	E	
1	236465	PA-DEE-BU	rice	<i>Oryza sativa</i> L.	10/08	Myanmar	Kachin	SUMPRABUN	LAT-WHA-YAN near INSUP	26	0	8.6	N	97	32	23.6	E	280
2	236466	KHAN-TEE	rice	<i>Oryza sativa</i> L.	10/08	Myanmar	Kachin	SUMPRABUN	LAT-WHA-YAN near INSUP	26	0	8.6	N	97	32	23.6	E	280
3	236467	-	Indian nightshade	<i>Solanum torvum</i> SWARTZ.	10/10	Myanmar	Kachin	SUMPRABUN		26	6	53.2	N	97	30	6.2	E	377
4	236468	KATHAN-NAM	rice	<i>Oryza sativa</i> L.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	22.6	N	97	29	30	E	339
5	236469	N-HKYENG-NAM	rice	<i>Oryza sativa</i> L.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	22.6	N	97	29	30	E	339
6	236470	N-NYENG-MAN	rice	<i>Oryza sativa</i> L.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	22.6	N	97	29	30	E	339
7	236471	YA-GYI	foxtail millet	<i>Setaria italica</i> (L.) P. BEAUV.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	22.6	N	97	29	30	E	339
8	236472	YA	finger millet	<i>Eleusine coracana</i> (L.) GAERTN.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	22.6	N	97	29	30	E	339
9	236473	JL-LING	rice	<i>Oryza sativa</i> L.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	59.4	N	97	29	48.4	E	339
10	236474	CHYING-NAM	sesame	<i>Sesamum indicum</i> L.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	59.4	N	97	29	48.4	E	339
11	236475	SI-GA-HKA-SI	bitter guard	<i>Momordica charantia</i> L.	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	59.4	N	97	29	48.4	E	339
12	236476	LAKAWNG-MAM-LI	rice	<i>Oryza sativa</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	HTING-BAI-MARE	26	16	18.5	N	97	29	18.7	E	593
13	236477	N-BAWNG-MOM-LI	rice	<i>Oryza sativa</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	HTING-BAI-MARE	26	16	8.1	N	97	29	16.5	E	612
14	236478		(turmeric)	<i>Curcuma</i> sp.	10/11	Myanmar	Kachin	SUMPRABUN	HTING-BAI-MARE	26	16	18.1	N	97	29	17.7	E	589
15	236479		(ginger)	<i>Hedychium coronarium</i> J. KOENIG	10/10	Myanmar	Kachin	SUMPRABUN		26	15	8	N	97	29	40.8	E	546
16	236480		(turmeric)	<i>Curcuma aromatica</i> SALISB	10/11	Myanmar	Kachin	SUMPRABUN	HTING-BAI-MARE	26	16	18.1	N	97	29	17.7	E	589
17	236481	GRI-BAU	job's tear, adley	<i>Coix lacryma-jobi</i> L. var. <i>ma-yuen</i>	10/10	Myanmar	Kachin	SUMPRABUN	KARAN-YANG-MARE	26	7	59.4	N	97	29	48.4	E	339
18	236482		bamboo	( <i>Bambusa</i> sp. ?)	10/11	Myanmar	Kachin	SUMPRABUN		26	13	14.8	N	97	29	42.8	E	487
19	236483	N-HKYEN-MAN	rice	<i>Oryza sativa</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	KA-WA-PANG	26	10	53.9	N	97	30	45.6	E	503
20	236484	KHA-DA-RI-SI	(cucurbit)	<i>Momordica foetida</i> SCHUMACH.	10/11	Myanmar	Kachin	SUMPRABUN	KA-WA-PANG	26	10	53.9	N	97	30	45.6	E	503
21	236485	N-HKYENG-MAM	rice	<i>Oryza sativa</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	DA-RU-HKA	26	8	48.4	N	97	30	52.5	E	242
22	236486	N-HPRAW-MAM	rice	<i>Oryza sativa</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	DA-RU-HKA	26	8	35.3	N	97	30	58.2	E	251
23	236487	N-GYIN-SI	sesame	<i>Sesamum indicum</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	DA-RU-HKA	26	8	35.3	N	97	30	58.2	E	251
24	236488	JIN-KA	melon	<i>Cucumis melo</i> L.	10/11	Myanmar	Kachin	SUMPRABUN	DA-RU-HKA	26	8	35.3	N	97	30	58.2	E	251
25	236489		wild okra	<i>Abelmoschus tuberculata</i> PAL et SINGH ?	10/12	Myanmar	Kachin	SUMPRABUN		26	4	16	N	97	31	45.3	E	336
26	236490	HM-ZI	rice	<i>Oryza sativa</i> L.	10/12	Myanmar	Kachin	MYITKYINA	KYAN-KHRAN	25	39	46.4	N	97	30	9.1	E	172
27***	236491	AF-KONE	pumpkin	<i>Cucurbita moschata</i> L.	10/12	Myanmar	Kachin	MYITKYINA	KYAN-KHRAN	25	39	46.4	N	97	30	9.1	E	172
28	236492		wild rice	<i>Oryza officinalis</i> WALL ex WATT.	10/12	Myanmar	Kachin	MYITKYINA		25	39	39.9	N	97	30	13.5	E	152
29	236493	KYAUK-GINE		( <i>Zingiberaceae</i> sp.)	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
30	236494	GINE		( <i>Zingiberaceae</i> sp.)	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
31	236495	GAL-YIN		<i>Hosta</i> sp. ?	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
32	236496	MA-KYAN	(Kachin pepper)	<i>Xanthoxylum alatum</i> ROXB.	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
33	236497	K-JI-MAM	sesamum	<i>Sesamum indicum</i> L.	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
34	236498	YI-SHA-PA-SHL	rice bean	<i>Vigna umbellata</i> (THUNB.) OHWI et OHASHI	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
35	236499	PHT-KI-SI	coriander	<i>Coriandrum sativum</i> L.	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
36***	236500	KYAT-HIN-KHA-CHO	(cucurbit)	<i>Momordica foetida</i> SCHUMACH.	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
37	236501		sesame	<i>Sesamum indicum</i> L.	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
38	236502	(-PAE)	rice bean	<i>Vigna umbellata</i> (THUNB.) OHWI et OHASHI	10/13	Myanmar	Kachin	MYITKYINA	NYITKYINA	25	23	1.9	N	97	24	6.8	E	147
39	236503	MAM-TING-DIN	rice	<i>Oryza sativa</i> L.	10/13	Myanmar	Kachin	N-JANG-YANG	MYIT-SONE, near N-JANG-YANG	25	43	7.4	N	97	30	56.6	E	180
40	236504	CHYING-NAM	sesame	<i>Sesamum indicum</i> L.	10/13	Myanmar	Kachin	N-JANG-YANG	MYIT-SONE, near N-JANG-YANG	25	43	7.4	N	97	30	56.6	E	180
41	236505	GYIN	ginger	<i>Zingiber officinale</i> ROSC.	10/11	Myanmar	Kachin	SUNPRABON	DA-RU-HKA	26	8	35.3	N	97	30	58.2	E	251

\* Collection No. is designated as COL/MYANMAR/2009/UT-MAS-NIAS/(Sr. No.) for each. It's order is not always corresponding with that of collection date.

\*\* Z-number means accession No. at the University of Tsukuba.

\*\*\* No mature seeds were obtained from two collected samples.



Source	Status	Status of plant sampled	Cultural practices	Sowing month	Harvest month	Topography	Site	Stoniness	Soil texture	Drainage	Other observations	Waypoint
farmstore	landrace	bulk	shifting	4/5	10/11	mountainous	(slope)	(low/med)	(silty loam)	(good)	non-waxy ("kauk chaw" type), white grain, grown at "taung-ya" fields	09-10
farmstore	landrace	bulk	shifting	4/5	10/11	mountainous	(slope)	(low/med)	(silty loam)	(good)	non-waxy ("kauk chaw" type), a little bit sweet, white grain, grown at "taung-ya" fields	09-10
roadside	wild	a single plant	-	-	-	mountainous	slope	medium	sand	moderate		09-18
farmstore	landrace	bulk	shifting	4/5	9/10	mountainous	(slope)	(low)	(silty loam)	(good)	non-waxy ("kauk chaw" type), white grain	09-20
farmstore	landrace	bulk	shifting	4/5	9/10	mountainous	(slope)	(low)	(silty loam)	(good)	non-waxy, red grain	09-20
farmstore	landrace	bulk	shifting	4/5	9/10	mountainous	(slope)	(low)	(silty loam)	(good)	waxy ("kauk hnyin" type), white grain, used for rice wine brewing	09-20
farmstore	landrace	bulk	shifting	4/5	9/10	mountainous	(slope)	(low)	(silty loam)	(good)	used for brewing	09-20
farmstore	landrace	bulk	shifting	4/5	9/10	mountainous	(slope)	(low)	(silty loam)	(good)	used for brewing	09-20
farmland	landrace	bulk	shifting	4/5	9/10	mountainous	slope	low	silty loam	good	collected at "taung-ya", used for cooked rice	09-22
farmland	landrace	bulk	shifting	4/5	10	mountainous	slope	low	silty loam	good	collected at "taung-ya", used for oil	09-22
farmland	landrace	bulk	shifting	3-5	-	mountainous	slope	low	silty loam	good	collected at "taung-ya", used vegetables	09-22
farmstore	landrace	bulk	shifting	3-5	10	mountainous	(slope)	-	(silty loam)	(good)	for cooked rice	09-30
farmland	landrace	bulk	shifting	3-5	10	mountainous	slope	medium	silty loam	good	collected at "taung-ya", waxy ("kauk hnyin" type), used for cooked rice	09-32
roadside	weedy	a single plant	-	-	-	mountainous	slope	medium	loam	moderate	Z-241**	09-33
roadside	weedy	a single plant	-	-	-	mountainous	slope	medium	loam	moderate	Z-240**	09-28
roadside	weedy	a single plant	-	-	-	mountainous	slope	medium	loam	moderate	Z-242**	09-33
farmland	landrace	bulk	shifting	4/5	10	mountainous	slope	low	silty loam	good	collected at "taung-ya", used food, supplement to rice	09-22
roadside	wild	a single plant	-	-	-	mountainous	slope	medium	silty loam	moderate	just flowering & ripening	09-36
farmland	landrace	bulk	shifting	4/5	11/12	mountainous	(slope)	(medium)	(silty loam)	(good)	for rice wine brewing	09-37
farmstore	landrace	bulk	shifting	-	-	mountainous	(slope)	(medium)	(silty loam)	(good)	fruits for vegetables	09-37
farmstore	landrace	bulk	shifting	3-5	8/9	mountainous	(slope)	(medium)	(silty loam)	(good)	waxy ("kauk hnyin" type), used for rice wine brewing	09-38
farmland	landrace	bulk	shifting	3-5	8/9	mountainous	slope	low	silty loam	good	collected at "taung-ya", used for cooked rice	09-39
farmland	landrace	bulk	shifting	3-5	10/11	mountainous	slope	low	silty loam	good	collected at "taung-ya", white seed, used for oil	09-39
farmland	landrace	bulk	shifting	4&10	10&3	mountainous	slope	low	silty loam	good	collected at "taung-ya"	09-39
roadside	wild	a single plant	-	-	-	mountainous	slope	medium	silty loam	moderate	yellow flower	09-42
farmstore	landrace	bulk	shifting	6	10	hilly	slope	(low)	(silty loam)	(good)	waxy ("kauk hnyin" type), red grain, for rice wine brewing	09-46
farmstore	landrace	bulk	shifting	6	10	hilly	slope	(low)	(silty loam)	(good)	(no seed obtained)	09-46
stream bank	wild	bulk	-	-	-	undulating	depression	low	loam	moderate	tall, just ripening, near a bridge	09-47
market	wild	bulk	-	-	-	-	-	-	-	-	transported from Waing-maw T/S, Z-244**	09-49
market	wild	bulk	-	-	-	-	-	-	-	-	transported from Waing-maw T/S, Z-245**	09-49
market	wild	bulk	-	-	-	-	-	-	-	-	PAN-U in Myanmar, from Myikyina T/S, Z-246**	09-49
market	landrace	bulk	-	-	-	-	-	-	-	-	transported from Putao T/S	09-49
market	landrace	bulk	(shifting)	-	-	-	-	-	-	-	white seed, transported from Waing-maw T/S	09-49
market	landrace	bulk	(shifting)	-	-	-	-	-	-	-	transported from Waing-maw T/S	09-49
market	landrace	bulk	-	-	-	-	-	-	-	-	transported from Waing-maw T/S	09-49
market	landrace	bulk	-	-	-	-	-	-	-	-	vegetables, transported from Zee-lon village, 4 miles from Myikyina, (no seed obtained)	09-49
market	landrace	bulk	-	-	-	-	-	-	-	-	black seed, transported from Waing-maw T/S	09-49
market	landrace	bulk	(shifting)	-	-	-	-	-	-	-	transported from Waing-maw T/S	09-49
farmland	landrace	bulk	shifting	6	10	hilly	slope	low	silty loam	good	collected at "taung-ya"	09-54
farmland	landrace	bulk	shifting	6	10	hilly	slope	low	silty loam	good	collected at "taung-ya"	09-54
farmland	landrace	bulk	shifting	-	-	mountainous	slope	low	silty loam	good	collected at "taung-ya" Z-243**	09-39



Photo 1. Various cultivated and wild vegetables, fruits, spices and cereals were sold in a marketplace of Myitkyina.



Photo 2. Rice was grown on terraces as well as on *taung-ya* fields of hills in the vicinity of Myitkyina.



Photo 3. *Taung-ya* cultivation fields were managed on a steep slope in the mountains. A hut was erected in every *taung-ya* field to watch for birds and animals and for storing farming tools and the harvests.