

Agricultural Practices and Uses of Crops

Most of the explored area is occupied by Lepchas and Gorkhas. The food habits of both communities was almost same. They use rice with meat and pulses. The rice bean is a very common pulse crop in the region, particularly in Sikkim and other beans like French bean, cowpea, sword bean are also consumed with rice.

Terrace cultivation on slopes is a common practice under rainfed condition and diverse crops comprising of adzuki bean, french bean, lablab bean, moong bean, rice bean, soybean, uridbean, barley, buckwheat, minor millets, maize, wheat, brinjal, chillies, cucurbits, tomato and banana, cardamom, Coix, Perilla are grown. It was noted that Coix lacryma-jobi is grown as fodder crop only. However, Arora *et al.* (1977) reported that Coix is grown for dual purposes as minor food and fodder. Rice bean locally known as *Masam* is generally grown with rice (on bunds) or as mixed cropping with maize/vegetable crops and sometimes as a sole crop. In hill slopes, the bold seeded type rice bean is grown whereas the small seeded are grown with rice crop. Fresh pods of bold seeded type are used as green vegetable and mature seeds are used as pulse. Rice bean is used as fodder crop also. French bean is cultivated as vegetable and pulse crop. Lablab bean and sword bean are used as green vegetable and cooked with rice and other vegetables too. A mixed farming (Jhoom) of different crops like adzuki bean, brinjal, chillies, french bean, maize, Perilla and rice bean were also observed which showed a wide maturity duration. In all parts of Sikkim and Darjeeling, crop sowing is done by broadcasting method or in line sowing, manually after the first monsoon. Buckwheat (*F. tataricum*), known as Phaphar teeta, is also used as leafy vegetable. Tree tomato (*Cyphomandra betacea*) fruit is used to prepare Chatni or used as substitute of tomato in preparation of vegetables. Perilla is grown all over subtropical Himalayas and in North Eastern Hill region. This is consumed in the form of Chatni, edible oil and spices. This crop has also medicinal properties. The seed and fruit of Indrayan (*Citrullus colocynthis*) are eaten by tribal people after roasting.

Germplasm Diversity Collected

A total fifty-two samples were collected. These include rice bean (12); adzuki bean (5); soybean (1); french bean (4); moong bean (1); lablab bean (1); sword bean (2) in pulses/grain legumes; barley (3); wheat (1); buckwheat (5); maize (2) in cereals/pseudocereals; brinjal (2); chilli (4); pumpkin (2); tree tomato (2) in vegetables; banana (1); white indrayan (1); *Perilla* (2) and ornamental chilli

(*Capsicum* species) (1) were the miscellaneous collections among. The number of collected material along with indigenous collector number, collection sites, districts and states is given in Table 1. The extent of crop variability observed and collected in different crops is discussed as under:

Pulses/Grain Legumes

The rice bean plants had tall viny growth with heavy pod bearing and showed variability particularly in seed colour and seed size. Two types of rice bean plant habit i.e. viny (indeterminate) and bushy (determinate) were found. Considerable diversity was observed in the characteristics of pod size, seed shape, seed size and seed colour. The pod length varied from 8.00 cm to 15.00 cm. The seeds with different colours such as dark red, creamy/pale white, greenish black and brownish were collected. Collections made in Adzuki bean did not show much variability in respect of pod length and seed colour. Seed colour variability was seen and collected in French bean. Variations were observed in lablab bean and sword bean. The pod length of sword bean was observed upto 13-18 cm.

Cereals/Pseudocereals

One landrace of wheat with red seed colour having cold and drought resistance was collected from Western Sikkim area. Huskless barley accessions were collected from Eastern Sikkim (2) and South Sikkim (1), respectively.

Vegetables

Every household grows different local vegetables in the area in their backyard/kitchen garden and in irrigated fields/fertile patches for domestic as well as commercial purposes. Diversity was collected in pumpkin, chilli, brinjal and tree tomato (*Cyphomandra betacea* Cav.). The tree tomato bears heavily with 3-4 fruits in one cluster (Fig 2). Two distinct types was noted in tree tomato one with red fruit while other is violet at their ripening stage. Two distinct brinjal accessions (one with white round medium fruit and another with small red fruits) at ripening, looking like tomato, were also collected from Korphector village Namachi of Southern Sikkim.

Miscellaneous

Four sample viz. bhanjira (*Perilla frutescens*) (2), banana (*Musa paradisiaca*) (1), Indrayan (*Citrullus colocynthis*) and ornamental chilli (*Capsicum* species) were collected. Indrayan was collected from jungle of Sukhia in Darjeeling district. The fruit weight ranged from 800 to 1200 g with thick and hard skin. One unique sample of Ornamental

Table 1. List of crop germplasm collections from parts of Sikkim, Darjeeling district of Bengal

S. No.	Coll. No.	IC. No.	Conman Name	Scientific Name	Site of collection	District	State
1.	RPD-1	IC-364039	Rice bean	<i>Vigna umbellata</i>	Tirkutam busty	E. Sikkim	Sikkim
2.	RPD-2	IC-364040	Barley	<i>Hordeum vulgare</i>	Martam khadi	E. Sikkim	Sikkim
3.	RPD-3	IC-364041	Rice bean	<i>Vigna umbellata</i>	Rawtay rumtek	E. Sikkim	Sikkim
4.	RPD-4	IC-364042	Barley	<i>Hordeum vulgare</i>	Rawtay rumtek	E. Sikkim	Sikkim
5.	RPD-5	IC-364043	Buck wheat	<i>Fagopyrum tataricum</i>	Rawtay rumtek	E. Sikkim	Sikkim
6.	RPD-6	IC-364044	Buck wheat	<i>Fagopyrum esculentum</i>	Rawtay rumtek	E. Sikkim	Sikkim
7.	RPD-7	IC-364045	Soybean	<i>Glycine max</i>	Sazong	E. Sikkim	Sikkim
8.	RPD-8	IC-364046	Pumpkin	<i>Cucurbita moschata</i>	Sazong	E. Sikkim	Sikkim
9.	RPD-51	IC-364089	Ornamental chilli	<i>Capsicum species</i>	Nazitam	Gangtaok	Sikkim
10.	RPD-9	IC-364047	Rice bean	<i>Vigna umbellata</i>	Tumlang	Mungum	Sikkim
11.	RPD-10	IC-364048	Barley	<i>Hordeum vulgare</i>	Tumlang	Mungum	Sikkim
12.	RPD-11	IC-364049	Buck wheat	<i>Fagopyrum tataricum</i>	Phondong	Mungum	Sikkim
13.	RPD-12	IC-364050	Mung bean	<i>Vigna radiata</i>	Dahan goan	Namchi	Sikkim
14.	RPD-13	IC-364051	Buck wheat	<i>Fagopyrum esculentum</i>	Dahan goan	Namchi	Sikkim
15.	RPD-14	IC-364052	Rice bean	<i>Vigna umbellata</i>	Uttarey	Geyzing	Sikkim
16.	RPD-15	IC-364053	Beans	<i>Vigna sp.</i>	Legship	Geyzing	Sikkim
17.	RPD-16	IC-364054	Rice bean	<i>Vigna umbellata</i>	Uttarey	Geyzing	Sikkim
18.	RPD-52	IC-364090	Banana	<i>Musa paradisiacal</i>	Bormik	Geyzing	Sikkim
19.	RPD-17	IC-364055	Wheat	<i>Triticum aestivum</i>	Martam upper	Geyzing	Sikkim
20.	RPD-18	IC-364056	Buck wheat	<i>Fagopyrum tataricum</i>	Lower budang	Geyzing	Sikkim
21.	RPD-19	IC-364057	Chilli	<i>Capsicum annum</i>	Korohector	Namchi	Sikkim
22.	RPD-20	IC-364058	Chilli	<i>Capsicum annum</i>	Korphector	Namchi	Sikkim
23.	RPD-21	IC-364059	Brinjal	<i>Solanum melongena</i>	Korphector	Namchi	Sikkim
24.	RPD-22	IC-364060	French bean	<i>Phaseolus vulgaris</i>	Nandugaoan	Namchi	Sikkim
25.	RPD-23	IC-364061	Rice bean	<i>Vigna umbellata</i>	Nandugaoan	Namchi	Sikkim
26.	RPD-24	IC-364062	Pumpkin	<i>Cucurbita moschata</i>	Nandugaoan	Namchi	Sikkim
27.	RPD-25	IC-364063	Chilli	<i>Capsicum annum</i>	Nandugaoan	Namchi	Sikkim
28.	RPD-26	IC-364064	Rice bean	<i>Vigna umbellata</i>	Upper lameta	Darjeeling	N. Bengal
29.	RPD-27	IC-364065	Bitter apple	<i>Citrullus colocynthis</i>	Upper lameta	Darjeeling	N. Bengal
30.	RPD-28	IC-364066	Rice bean	<i>Vigna umbellata</i>	Lepcha	Darjeeling	N. Bengal
31.	RPD-29	IC-364067	Chilli	<i>Capsicum annum</i>	Lepcha	Darjeeling	N. Bengal
32.	RPD-30	IC-364068	Maize	<i>Zea mays</i>	Lepcha	Darjeeling	N. Bengal
33.	RPD-31	IC-364069	Brinjal	<i>Solanum melongena</i>	Poysshore	Darjeeling	N. Bengal
34.	RPD-32	IC-364070	Tree tomato	<i>Cyphomandra betacea</i>	Poysshore	Darjeeling	N. Bengal
35.	RPD-33	IC-364071	Perilla	<i>Perilla frutescens</i>	Poysshore	Darjeeling	N. Bengal
36.	RPD-34	IC-364072	Maize	<i>Zea mays</i>	Kalawal rangbay	Darjeeling	N. Bengal
37.	RPD-35	IC-364073	Adzuki bean	<i>Vigna angularis</i>	Kalawal rangbay	Darjeeling	N. Bengal
38.	RPD-36	IC-364074	Tree tomato	<i>Cyphomandra betacea</i>	Okyt 7 mile	Darjeeling	N. Bengal
39.	RPD-37	IC-364075	Lablab bean	<i>Lablab purpureus</i>	Okyt 7 mile	Darjeeling	N. Bengal
40.	RPD-38	IC-364076	French bean	<i>Phaseolus vulgaris</i>	Okyt 7 mile	Darjeeling	N. Bengal
41.	RPD-39	IC-364077	Adzuki bean	<i>Vigna angularis</i>	Mirik	Darjeeling	N. Bengal
42.	RPD-40	IC-364078	Adzuki bean	<i>Vigna angularis</i>	Mirik	Darjeeling	N. Bengal
43.	RPD-41	IC-364079	Rice bean	<i>Vigna umbellata</i>	Mirik	Darjeeling	N. Bengal
44.	RPD-42	IC-364080	Rice bean	<i>Vigna umbellata</i>	Rajbari	Darjeeling	N. Bengal
45.	RPD-43	IC-364081	Rice bean	<i>Vigna umbellata</i>	Rajbari	Darjeeling	N. Bengal
46.	RPD-44	IC-364082	French bean	<i>Phaseolus vulgaris</i>	Rajbangay	Darjeeling	N. Bengal
47.	RPD-45	IC-364083	French bean	<i>Phaseolus vulgaris</i>	Dali	Darjeeling	N. Bengal
48.	RPD-46	IC-364084	Perilla	<i>Perilla frutescens</i>	Neemka dada	Darjeeling	N. Bengal
49.	RPD-47	IC-364085	Sword bean	<i>Canavalia gladiata</i>	Rangbul	Darjeeling	N. Bengal
50.	RPD-48	IC-364086	Sword bean	<i>Canavalia gladiata</i>	Rangbul	Darjeeling	N. Bengal
51.	RPD-49	IC-364087	Adzuki bean	<i>Vigna angularis</i>	Gorabari	Darjeeling	N. Bengal
52.	RPD-50	IC-364088	Adzuki bean	<i>Vigna angularis</i>	Gorabari	Darjeeling	N. Bengal



Fig. 2: Tree tomato (*Cyphomandra betacea*) in cluster collected from Okyat near Darjeeling in North Bengal

chilli (*Capsicum* species) was collected from Nazitam, Near Rumtek, Gangtok (Fig. 3). The plant height is about 75 cm and bears 2-4 fruits per plant. The fruit is drooping and triangular in shape with long peduncle and becomes yellowish red at ripening.

Acknowledgements

The authors are thankful to Dr. BS Dhillon, Director and Dr. SS Malik, Head, Exploration Division, National Bureau of Plant Genetic Resources, New Delhi for providing valuable guidance and essential facilities.



Fig. 3: A unique ornamental chilli collected from Nazitam, Gangtok, Sikkim

References

- Arora RK, KPS Chandel, KC Pant and BD Joshi (1980) Rice bean—a tribal pulse of eastern India. *Econ. Bot.*, **34**: 260-263.
- Arora RK (1977) Job's tears (*Coix lacryma-jobi*) – a minor food and fodder crop of north eastern India. *Econ. Bot.* **31**: 358-366.
- Arora RK (1979-1982) Collecting in Sikkim Himalayas. *IBPGR Newsletters*, FAO, Rome.
- Patiram, RK Awasthi and SBS Bhaduria (1999) Sustainable land utilization for ecological balance in the Sikkim hills. *J. Hill Res.* **12**: 83-85.
- Chomchalow N, CLL Gowda and P Laosuwan (eds) (1990) *Proc. work Under-exploited and Potential Food Legumes in Asia*. Thailand, FAO/UNDP.