Table 3. Characterization of collected germplasm

Accession	Plant height (cm)	No. of fruits/ plant	Individual fruit weight (g)	No. of seed/ fruit	Branches/ plant	Yield/ plant (kg)
MD-1	2.80	95	18.00	16	9	2.33
MD-2	1.95	72	13.60	22	10	1.50
MD-3	2.45	98	15.00	20	8	1.97
MD-4	2.60	88	12.20	15	11	1.45
MD-5	3.30	105	16.20	23	16	2.85
MD-6	1.50	45	19.40	18	12	1.65
MD-7	3.50	102	14.00	20	10	2.22
MD-8	3.95	87	13.00	12	14	2.38
MD-9	2.20	48	10.50	19	8	1.85
MD-10	1.54	32	8.20	23	13	1.20
MD-11	1.68	55	10.50	21	14	1.85
MD-12	2.95	101	11.65	14	15	2.43
MD-13	3.00	95	12.42	17	12	2.00
MD-14	2.25	80	9.30	10	8	1.20
MD-15	1.65	90	8.20	16	6	1.00
MD-16	3.40	120	13.00	22	14	2.30
MD-17	3.00	110	11.00	17	10	2.00
MD-18	3.10	105	12.00	26	19	2.80
Mean	2.59	84.88	12.68	18.38	11.61	1.94
Range	1.50-3.95	32-120	8.20-19.4	10-23	6-19	1.00-2.85

weight, which determines the yield, fruit varies greatly (8.20–19.4). Seeds of Kartoli are round and differ greatly from other species of *Momordica*. More number of seeds/fruit was counted in MD-6 and MD-10 each of 23. More number of seeds in a fruit is not a desirable character in Kartoli. So, less-seeded genotypes *i.e.* MD-14(10) and MD-8(12) were considered as best genotypes. Both the selected genotypes were soft-seeded and more fleshy. It is true that more number of fruits were born on thinner branches. For this trait MD-18(19) and MD-5(16) were considered best genotypes among the accessions available. MD-5 genotype yielded poor due to less number of branches.

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Interception of Insect and Mite Pests in Germplasm under Exchange during the Year 2000

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Key Words: Insect, Mites, Interceptions, Germplasm, Quarantine

Exchange of planting material has a significant role in diversifying and stabilizing agricultural production but involves an inherent risk of introduction of exotic pests in a given geographical area. The role of quarantine is important in preventing the possible entry of exotic pests, which may accompany the incoming and planting material. It is on record that distribution of several pests and pathogens have resulted from the movement of infested germplasm and the introduced pests have proved more dangerous in the new areas as they can flourish unchecked by their natural enemies. The importance of plant quarantine is indicated in the number of interceptions of insects and mites made during previous years, which include *Bruchidius glycyrrhizae* (Fab) in *Glycyrrhiza uralensis* from USSR, *Bruchophagus mellipes* in *Sesbania* spp. from Philippines and *Megastigmus aculeatus* in *Rosa* spp. from N. Arctic Region (Mathur and Lal, 1996).

A total of 1,22,365 samples (1,22,183 imported and 182 exported) comprising seeds, tubers, bulbs, suckers, rhizomes, cuttings, seedlings and rooted plants of different crops and their wild relatives were received for quarantine clearance in the year 2000. These samples were examined visually, under high magnification and the seeds of plant

genera (suspected to carry hidden infestation) were exposed to X-ray radiography or rendered transparent to detect the infestation. Details of detection techniques used are as follows:

Visual examination: Seeds/planting materials were examined by naked eye or with the help of magnifiers. The external infestation was detected by presence of external symptoms of insect damage *i.e.* holes, rotting, swelling or any other deformity *etc.* or presence of dead or live insects/mites, eggs/egg shells, immature stages, exuviae or excreta thereof.

X-ray radiography: A total of 2,741 exotic seed samples of the plant genera known to carry hidden infestation of bruchids, chalcids and others were subjected to X-ray radiography. Seeds were arranged on paper and exposed to soft X-rays at 22 Kv, 3 mA for 15 seconds at the distance of 30 cm.

Transparency technique: Small seeds like grasses which are difficult to salvage through X-ray radiography, were rendered transparent by heating in lactophenol-acid fuchsin (phenol 2 parts, lactic acid 2 parts, glycerine 1 part, distilled water (hot) 2 parts, little acid fuchsin for detection of internal infestation (Kaura, 1959).

A thorough examination revealed that 1,746 samples were found infested with various insects and mites by using detection techniques *viz.*-visual examination (1,413), and X-ray radiography (333). The infested material was salvaged using one or more of the following treatments.

X-ray radiography: On developing the X–ray film the infested seeds were distinguished and were hand-picked from the seed geometry and only healthy seeds were released (Wadhi, *et al.* 1967).

Fumigation: The seed material infested with external/ surface feeding and most common stored grain insect pests was fumigated in an airtight container at normal air pressure. Ethylene dichloride carbon tetra chloride (EDCT) mixture @ 320 mg/l for 48 h or 640 mg/l for 24 h at 30°C and some specific fumigation schedules were used for effective eradication (Anonymous, 1985).

Pesticidal dip/spray treatments: Infested rooted plants, cuttings, tubers and other vegetatively propagated material were given dip/spray treatment with suitable insecticide/ acaricide or a combination of both.

Mechanical cleaning: The seeds were cleaned mechanically by removing plant debris, deformed and shrivelled seeds by handpicking. Number of samples salvaged by various techniques given below.

Table 1. Pests intercepted in the germplasm under exchange during 2000

Pest	Host	Source
* *Bruchus ervi*	*Lens culinaris*	Syria, Chile, Greece, Iran, Lebanon, Italy, Germany, Morocco, Turkey, Russian Federation
Bruchus dentipes	*Vicia faba*	Syria
Bruchus lentis	*Lens culinaris*	Azerbaizan, Spain, Syria, Afghanistan
**Bruchophagus gibbus*	*Medicago sativa*	USA
Bruchophagus mellipes	*Sesbania* spp.	Philippines
Sitophilus zeamaise	*Zea mays*	Philippines
Sitotroga cerealella	*Oryza sativa*	Nepal
Tribolium castaneum	*Pennisetum typhoides*	Nepal
	Gypsophylla spp.	Israel
Aphids	*Punica* sp.	USA
Bugs	*Punica* sp.	USA
	Prunus sp	
Scales	*Juglans regia*	USA
Mites	*Cassava plants*	Vietnam
	Gypsophylla	Israel
	Juglans regia	USA
Immature forms	*Acacia* spp	Australia

* Pests not reported from India

Infested material was salvaged by employing the suitable disinfestation techniques/procedures *viz.*- X-ray radiography (333), fumigation (479), pesticidal dip/spray treatment (766) and mechanical cleaning (168).

In addition to salvaging of infested samples, 30092 samples were given prophylactic treatments *viz.*- 7707 seed samples were given prophylactic fumigation and 22385 samples of vegetative propagules were given pesticidal dip/spray.

The advantages of effective implementations of plant quarantine are clearly indicated by the number of important interceptions made during the period (Table 1). *Bruchus ervi*, (Coleoptera: Bruchidae) an important quarantine pest, not yet reported from India was intercepted in *Lens culinaris* from 11 countries and had been repeatedly intercepted from these countries. *Bruchophagus gibbus* (Hymenoptera: Chalcididae) is not yet known to occur in India was intercepted in *Medicago sativa* from USA. The quarantine significance of these two pests is further highlighted due to hidden nature of infestation. Other bruchids as *Bruchus dentipes, B. lentis,* and a chalcid, *Bruchophagus mellipes* also present a real quarantine risk being carried as latent infestation. Some of the serious pests *viz.*- *Sitophilus zeamaise*, *Sitotroga cerealella* and

Tribolium castaneum though already known to occur from the country are important from quarantine viewpoint as of their being different strains.

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Location-Specific Suitable Cultivars of Life-Supporting Crops

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Key Words: Pseudo-cereals, Small millets, Ricebean, Horsegram, Niger

Inspite of near food (rice and wheat) self sufficiency in the country, people living in tribal, hilly and backward areas do not have easy access to food and suffer from food and nutritional insecurity. On the other hand, pseudo-cereals, small millets, indigenous pulses, and oilseeds are the major source of sustenance to people in such areas. The tribal, hilly and backward areas are encapsulated with several physical, socio-economic and technical constraints. These include remoteness of the area, low economic viability and, in turn, low risk bearing capacity of the farmers. Small holding size, non-availability of location specific cultivars as well as techniques further add to the problems of farmers living in such areas. All these have been contributing to low productivity of crops. As a result, food and feed continues to be in short supply.

In view of an urgent need to enhance the production and productivity of different life support crop species, various activities *viz.*-varietal verification trials, quality seed production and front line demonstrations were undertaken under Programme-1 (Life supporting crops) of the Jai Vigyan National Science and Technology Mission on Household Food and Nutritional Security under NATP (National Agricultural Technology Project) in order to select location-specific suitable cultivars, make available quality seeds and also to popularize the improved cultivation techniques of crops under cultivation.

The programme is in operation at 11 selected centres namely – Palampur (Himachal Pradesh), Rudraprayag, Almora (Uttranchal), Imphal (Manipur), Umiam (Meghalaya), Ranchi (Jharkhand), Madhubani (Bihar), Banswara (Rajasthan), Akola, Sangliwadi (Maharashtra) and Raipur (Chhatisgarh). Performance of crops *viz.*-grain amaranth, buckwheat (pseudocereals), finger millet, foxtail millet, kodo millet, proso/little millet (small millets), rice bean, horsegram (indigenous pulses) and niger (oilseeds) was studied during *kharif* season of year 2000, and based on the findings (grain yield data), two to three top ranking suitable varieties for each centre/ location were selected, which are presented in this paper.

A total of 83 evaluation trials were conducted during *kharif* 2000, that included, grain amaranth (12), buckwheat (5), rice bean (11), horse gram (14), finger millet (18), foxtail millet (5), proso millet (5), little millet (4), kodo millet (4) and niger (5). In general, trials were allotted to each centre in pairs, so that one may be conducted on the research station and another in farmers' field for better exposure and participation of farmers from the initial stage itself. Trials were conducted in randomized block design (RBD) with three replications and recommended package of practices were adopted for each crop, details of which are presented in Table 1.

Grain yield data obtained from varietal trials conducted at different locations were analysed to find the suitability of cultivars for a particular location. Centre-wise performance of crops/varieties are as follows:

Palampur: In grain amaranth, Annapurna (11.67 q/ha) at Salooni and PRA 9401 (9.33 q/ha) at Sangla were found more suitable than other varieties. Sangla B-1 (29.40 q/ha) variety of buckwheat recorded the highest