PART IV
Mountain Women as Beekeepers

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Beekeeping—An Income-generating Cottage Industry for Rural Women in Pakistan

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Introduction

Pakistan occupies an area of about 0.8 million square kilometres. Its population comprises 100 million individuals and rural women and youth constitute over 50 per cent of the total of about 72 per cent of the rural population (Anon, 1987). In Pakistan, like in most Asian countries, small-scale agriculture makes up the bulk of total production and employment and rural women make a crucial, but silent and invisible contribution to agriculture and food production. They are the dominant labour force and are engaged in agricultural activities from preparation of the soil to post harvest operations. In some areas, males have their valuable indirect support in raising food and cash crops and other village-based commodities.

A much greater commitment to rural women's development and improvement of their economic conditions would be through income-generating programmes. New changes intended to benefit women should not add to their burden because they are already busy as mothers, producers and family cooks. Thus, the income-generating activities should be structured in a way that the women not only become significant co-earners of family income but also take care of their children and help their families in different agricultural operations.

Beekeeping has tremendous scope for expansion in the country (Ahmad and Muzaffar 1984). Transfer of appropriate technologies at their level will have a positive effect on both production and family income. An increased percentage of women in work force would be involved in this suitable scientific profession so as to bring them in to the mainstream of development as is the case in many developed countries. It would also suit women in the improvement of their health and nutritional standards with quick economic results.

Beekeeping and Rural Women

Like other industries, beekeeping depends upon capital, woman-man-power and raw material for its establishment and successful maintenance. There is no dearth of woman power for undertaking beekeeping as a rural industry. Several females, males and children can take up beekeeping as part time or full time occupation in the rural areas. Landless labourers, small farmers, women in landless families and persons engaged in other occupations can also keep honeybees and earn an additional livelihood in villages. Regarding the raw material, there is a huge and unutilized natural floral wealth that is waiting to be tapped, but is, at present, left back to nature. In highly industrialized countries, beekeeping technology tends to be capital intensive so as to reduce the inputs of woman-man-hours as in large factories. In Pakistan, beekeeping has to be labour-intensive to maximize creative self employment so that it is a way of life to be in tune with the natural environment and have lesser involvement of mechanical automation. Anyhow, among the village industries, beekeeping, if started on a small scale, is perhaps the only industry which demands the least capital investment. In fact, for beekeeping as a part time occupation, the only essential requirement to make a start is a few bee hives and a few other implements. A beekeeper with an initial investment of Rs 5000 (US$ 278) and five honeybee colonies can earn Rs 2700 (US$ 150) per annum. Thus the women can easily undertake beekeeping as a profitable cottage industry.

Besides honey production, honeybees are most important pollinating insects. A large number of crops and fruit and forest trees require or at least benefit from bee pollination. Honeybee colonies are rented out for pollination of crops and fruit plants in various countries. The farmers of California State pay about US$ 30 million annually to beekeepers as rent of honeybee colonies supplied to them for the pollination of their crops in comparison to beekeepers' income of about US$ 10 million from honey production. Thus, honeybees are an important component of the agricultural production system. The women of

rural areas can earn additional income from honey and can simultaneously help farmers in better yield of their crops.

Beekeeping products include honey, beeswax, royal jelly, pollen, propolis and bee venom. Honey is one of the most nutritive foods containing various kinds of sugars, proteins, free amino acids, minerals, trace elements, enzymes and vitamins with a fairly high caloric value (303 calories per 100 g). It has been used as a component of many commercially manufactured pharmaceutical products. At least 200 tons of honey is used in various types of cough mixtures in the world annually. Beeswax is used in cosmetic industry, beekeeping industry, pharmaceuticals, dentistry, foundries in manufacturing process, component of waterproofing materials and polishes for floors, furniture, appliances, leather, etc. Royal jelly is the most precious product of the hive. It is used for the treatment of human diseases, human dietary supplements, cosmetics and rearing queen bees. Pollen is used as a chief source of protein, fat and mineral for bees. It is also used as health food for stabilizing faulty metabolism. Propolis is the most precious product of beekeeping. It is used as health food, component of ointments for treating burns, external ulcers and eczema in human beings, in alcohol tincture for the treatment of hearing defects and in anaesthetics used in dental practice. Honeybee venom is produced in several countries and is used for the treatment of rheumatoid arthritis and several other diseases. It is also used for desensitizing hypersensitive individuals.

From the floral point of view, beekeeping has tremendous scope for expansion in the country. Some 900 plant species are known to constitute honeybee flora in Pakistan. Most of these are minor sources of nectar and pollen. Some plants produce nectar in large quantities, but these are not abundantly available and are therefore not important for beekeeping. Honey production is dependent on a few plant species which yield nectar abundantly and are sufficiently common to bees. Among these, alfalfa (*Medicago sativa*), berseem (*Trifolium* spp.), citrus (*Citrus* spp.), cotton (*Gossypium* spp.), mesquite (*Prosopis* spp.), phulai (*Acacia modesta)* and shain (*Plectranthus* spp.) are most important and provide a major part of commercial honey in the country.

The good location for beekeeping is one where there are at least three plant species which yield surplus honey in considerable quantities and bloom at different periods. Besides, there should be a great variety of minor plants yielding both pollen and nectar to support bees between main honey flows. Such locations are common almost throughout the country except in desert areas and fairly large quantities of honey can be produced from these areas.

Besides honey production, honeybees are very important pollinating insects. Several crops, and fruit and forest trees require, or at

least benefit from bee pollination. Among these, almond, apple, apricot, avocado, some varieties of citrus, peach, pear, persimmon, plum (fruit plants), alfalfa, clover (forage), sarson, safflower, some varieties of sunflower (oil seeds), carrots, cole crops, egg plants, onion, pumpkin, squash, radish, and turnip (vegetables) require honeybees to supplement pollination and to increase their yield.

Honeybee colonies have been rented for the pollination of crops and fruit plants in various countries. The rent of a honeybee colony in California, USA varies from $10 to 30 depending upon the flowering period and nectar and pollen potential of the crops and fruit trees. The farmers in Japan rent about 114,500 honeybee colonies annually for the pollination of strawberry, melon, watermelon and vegetable crops and fruit trees at the rate of 8000–15000 yen per colony. Honeybees are, therefore, vital to agriculture production system. It is important that our rural women and men start beekeeping both for honey production and crop pollination.

Popularization of Beekeeping through Low Cost Langstroth Hives

The oriental bee *A. cerana* is kept mostly in wall-, log-, and pitcher hives in most of the beekeeping areas particularly some parts of Peshawar, Hazara and Swat Divisions and Murree hills. The beekeepers, except a few progressive ones, of these areas are using traditional honeybee management practices. The modern Langstroth hives are very expensive. Therefore, beekeepers cannot afford to purchase them. Thus an abrupt change to Langstroth hive is not easily acceptable by beekeepers. Studies were, therefore, conducted to develop some low cost Langstroth type hives and comb foundation sheets to pursuade beekeepers of remote areas to use of modern hive and other equipment for increasing honey yield per colony.

Low cost hives were manufactured using indigenous material. The performance of *A. cerana* was tested in hives made up of: (1) clay and chopped wheat straw (CCWS); (2) glauconite, newspapers and fine wheat flour (GNPWF); (3) glauconite, newspapers, fine wheat flour and dry agave leaves (GNPWFAL); (4) cement, sand and newspapers (CSNP); (5) clay and rice husk (CRH); and (6) clay and rice husk ash (CRHA). These low cost hives proved almost equally well for the performance of bees. However, temperature maintained by honeybees was about 1–1.5°C lower in glauconite and clay hives in May–June (summer) and 1–2°C higher in December–January (winter) as compared to Langstroth hives. Transportation of all these hives was more difficult than that of Langstroth hives. The cement and sand hives were the heaviest.

These hives were recommended for stationary beekeeping. These are being popularized, both among the women and men beekeepers because of their low cost (US$ 1 to 2) as against the Langstroth hives (US$ 28) which are expensive owing to the high cost of wood.

Women who are restrained by some physical disability and are not able to participate in routine farm operations can get training in beekeeping at rural centres. These community development activities would directly benefit women and enhance their socio-economic conditions and family health. It has truly been advocated that shared power is a double power. Rapid development of the rural women and their full participation as equal partners in the economics and social mainstreams of national life is at present, one of the greatest challenge being faced by the country. Their participatory development approach would ensure fulfilment of needs and interconnected roles so that they can use their time and energy optimally for multiple tasks. There is no denying the fact that if rural women start beekeeping they can supplement their income by producing honey. The income-generating beekeeping programmes would provide them unique opportunities to enhance their productivity by increase in the yield of several crops through honeybee pollination with additional benefit from sale of bees, honey and other hive products.

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Mountain Women and Beekeeping in Nepal

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Introduction

When we speak of mountain women, we refer to those who live in rural communities with agriculture as their means of livelihood. Economically, a large proportion of them fall under the poverty line. But most of them are apparently self-sufficient because their needs are limited to fulfilling their basic needs. This situation is changing because farm productivity is declining, population pressure is increasing and market economy is on its way to development. Women in Nepal are the most neglected and under-previleged group in rural communities: one of the important tasks for future policy planners would perhaps be to integrate women skill into the social and economic development of the mountain population. Integration implies the utilization of women resources in some income-generating activities, e.g. beekeeping.

Mountain ecology is most suited for mixed farming and forestry activities. Horticulture development has been regarded as a most lucrative option for economic upliftment. Women play a key role in the socio-economic system of a rural community. Women can generate additional economic benefits from their off-farm activities and cottage industries if proper opportunities and facilities are provided to them. In certain parts of Nepal such as Rapti zone, Karnali zone and Seti zone, beekeeping has become an additional source of income for the family.

What are the Main Activities of Mountain Women?

Mountain women are very poor. They have to work from early in the morning to late in the night. Their main activities are:

1. cleaning the houses and carrying out all the household chores
2. cooking food
3. collecting fuelwood and fodder
4. grazing animals
5. preparing manures for their farms
6. fetching drinking water
7. working in the farms
8. taking care of their clothes
9. post-harvesting activities
10. weaving and knitting their clothes.

They have to devote all their time to their families and yet have no money at their own disposal. Therefore, beekeeping is an important income-generating activity for mountain women. Training should be given to them to bring about an awareness on modern techniques of beekeeping.

Advantages of Beekeeping for Mountain Women

There are many advantages for mountain women if they are involved in beekeeping. The following main advantages result from this profession:

1) Beekeeping is very compatible to mountain women as it is a less time-consuming profession and does not interfere with the day-to-day work.

2) Beekeeping is a profession which generates direct income. It has been proved that each family can earn Rs. 3400* per year per hive.

3) Since mountain women are directly involved in agricultural activities—beekeeping also improves agricultural and horticultural productivity through the process of cross-pollination. It should be noted however, that for this process, the environment should be free from pollution (especially from insecticides).

Beekeeping Constraints

In Nepal, native *Apis cerana* has been domesticated for honey production. This species is very suceptible to Thai sacbrood virus disease.

* 35 Nepalese rupees = 1 US$

This disease has killed more than 65 per cent bee colonies in several parts of Kathmandu valley in recent years. This disease was possibly brought into Nepal from China via India and Thailand. It is possible that the spread of this disease might also be due to the import of exotic *Apis mellifera* into Nepal. It is well known that the European bee (*Apis mellifera*) is commonly susceptible to virus diseases and this must be controlled at once by the concerned authorities. Otherwise consequences would be disastrous for the entire beekeeping industry in Nepal. Beekeeping with *Apis cerana* still faces some constraints like absconding, frequent swarming, predators, wax moths, robbing habits, production of large number of laying workers and other bee diseases. Sometimes beekeeping may fail due to lack of technical know-how. However, these problems can be solved by better management techniques. To overcome these problems, training in beekeeping must be given to both women and men. Recently, special emphasis is being put on training rural women so as to raise their status by demonstrating appropriate techniques and new skills in beekeeping.

Beekeeping can be conveniently integrated into the daily activities of mountain women for the following reasons:

1) Low investment
2) Cash income
3) Part-time job
4) Easy to learn and practise
5) Easy to market

The majority of mountain women in Nepal are illiterate. But, fortunately beekeeping requires no specialized education. They can learn beekeeping from some orientation programmes and can do it effectively, thereby generate substantial income. Beekeeping does not require any huge investments. Most mountain women from all over the country use traditional methods of beekeeping, producing about 2 to 5 kg of honey per year per colony. As per traditional method, they have to destroy their bee colonies at the time of honey extraction. But by using modern techniques mountain women can produce on an average 15 kg of honey per year from each colony without destroying the colonies. This can give them an additional income of about Rs 3,000 per year from each colony. Honey is in great demand and costs about Rs 200 per kg. Every mountain woman should start beekeeping from atleast two colonies to derive their benefit. If 10 colonies can be maintained, one can earn as much as Rs 30,000 per year and which would raise the standard of living considerably.

In addition to its being a potential source of income, the bee industry could also help in boosting agricultural production significantly by increasing the yield of crops, vegetables, fruits and seeds through

cross-pollination. Mountain farmers have no idea about the importance of bee pollination. It is well known that keeping honeybee colonies during the flowering of oil crops, wild flowers, vegetables, fruits and other agricultural crops, help in increasing the yield by 30 to 40 per cent which is the indirect benefit obtained from beekeeping. The list of the important honey plants is given in Table 9.1.

Beehive Types Found in Nepal

There are different types of beehives found in Nepal:

Traditional types	*Improved types*
1. Log hive	1. Newton 'A' village type hive
2. Wall hive	2. Newton 'B' type hive
3. Cavity hive	3. Indian hive
4. Old trunk hive	4. Godawari hive
5. Wooden box hive	5. African top bar hive

From all the above-mentioned beehives, Newton 'A' village type of bee hive is the best for honey production. Traditionally, mountain women use log and wall hives which are not profitable for them. Honey production also depends on the size of the bee hives, so appropriate bee hives should be used for generating more income.

Recommendations and Conclusions

1) Beekeeping may be integrated into any farming system in the mountains. Beekeeping promotes agricultural and horticultural productivity. Modern methods of beekeeping can be extended to most mountain communities. It would not be a new element in their system. Economic investment remains low, but yield is very high.

2) An initial training of two weeks and subsequent monthly supervision would be adequate for the development of beekeeping in mountain areas. Agricultural extension officers or technicians should be trained in beekeeping to promote this activity among the farmers.

3) There must be some Government support to run this industry on a larger scale. Bee hives should be given to the mountain women at subsidized rates by the government or aid donors. Bank loans should be made easily available through Agricultural Development Bank in Nepal.

4) There should be uniformity of bee hives throughout the country to run the extension programme on beekeeping.

5) A regional centre for beekeeping research and training both for the trainers and extension workers should be established in Kath-

mandu valley. Such a centre should promote research on local honeybees and local bee flora and their contribution to honey production.

TABLE 9.1

List of important nectar and pollen-yielding plants in different sites of Kathmandu valley

Plant Species	English Name	Family	Sources	Status	Flowering Months
					J F M A M J J A S O N D
Acacia arabica	Gum arabic tree	Leguminosae	N	M	
Adhatoda vassica	Malabarnut	Acanthaceae	N	m	
Aegle marmelos	Bel tree	Rutaceae	N	m	
Aesculus indica	Horse chestnut	Hippocastanaceae	N	m	
Albizzia lebbek	—	Leguminosae	P/N	M	
Albizzia procera	—	Leguminosae	P	M	
Albizzia odoratissima	—	Leguminosae	P	M	
Allium ascalonicum	Shahallot	Liliaceae	P	M	
Allium cepa	Onion	Liliaceae	P	M	
Allium tuberosum	Chinese leek	Liliaceae	P	M	
Allium sativum	Garlic	Liliaceae	P	M	
Avena sativa	Dat	Gramineae	P	m	
Azadirachta indica	Neem tree	Meliaceae	N	M	
Bauhinia malabaricum	Bauhinia	Leguminosae	P	M	
Bauhinia purpurea	Pink bauhinia	Leguminosae	P/N	M	
Bauhinia variegata	White bauhinia	Leguminosae	N	M	
Berberis aristata	Nepal barberry	Berberidaceae	P/N	m	
Berberis asiatica	Common barberry	Berberidaceae	P/N	m	
Berberis macrosephala	—	Berberidaceae	P/N	m	
Bombax malabaricum	Silk cotton tree	Bombacaceae	N	M	
Brassica campestris	Red mustard	Cruciferae	P/N	M	
Brassica juncea	Indian mustard	Cruciferae	P/N	M	
Brassica nigra	Black mustard	Cruciferae	P/N	M	
Brassica oleracea	Cauliflower	Cruciferae	P/N	M	
Brassica rapa	Turnip	Cruciferae	P/N	M	
Calendula sp.	—	Compositae	N	M	
Callistemon lanceolatus	Bottle brush	Myrtaceae	N	M	

Cannabis sativa	True hemp	Cannabinaceae	P	m
Capsicum annum	Capsicum	Solanaceae	P	m
Capsicum fruitescens	Red cluster pepper	Solanaceae	P	m
Capsicum microcarpum	Bird pepper	Solanaceae	P	m
Carica papaya	Papaya	Caricaceae	N	M
Carthamus tinctorius	Bastard saffrom	Compositae	P	m
Cassia fistula	Cassia pods	Leguminosae	N	M
Cassia floribunda	—	Leguminosae	N	M
Cassia mimosoides	—	Leguminosae	N	M
Castanopsis indica	Nepal chestnut	Fagaceae	P	M
Castanopsis tribuloides	—	Fagaceae	P	M
Cedrela toona	Tooni	Meliaceae	N	m
Chickrassia tabulars	—	Meliaceae	N	M
Chenopodium album	Lamb's Quarter	Chenopodiaceae	P	m
Chenopodium ambrosioides	—	Chenopodiaceae	P	m
Chrysanthamum cinerariaefolium	Insect flower	Compositae	n	m
Cicer arietinum	Chick pea	Leguminosae	P/N	m
Cinnamomum tamala	Cinnamon leaf	Lauraceae	N	m
Cinnamomum zeylanicum	Cinnamon bark	Lauraceae	N	m
Citrullus colocynthis	Bitter apple	Cucurbitaceae	P	M
Citrus aurantifolia	Lime	Rutaceae	N	M
Citrus grandis	Melon fruit	Rutaceae	N	M
Citrus junos	Rough lemon	Rutaceae	N	M
Citrus limetioides	Sweet lime	Rutaceae	N	M
Citrus media	Citron	Rutaceae	N	M
Citrus sinensis	Sweet orange	Rutaceae	N	M
Colebrookea oppositifolia	—	Labiatae	P	M
Coriandrum sativum	Coriander	Umbelliferae	N	M

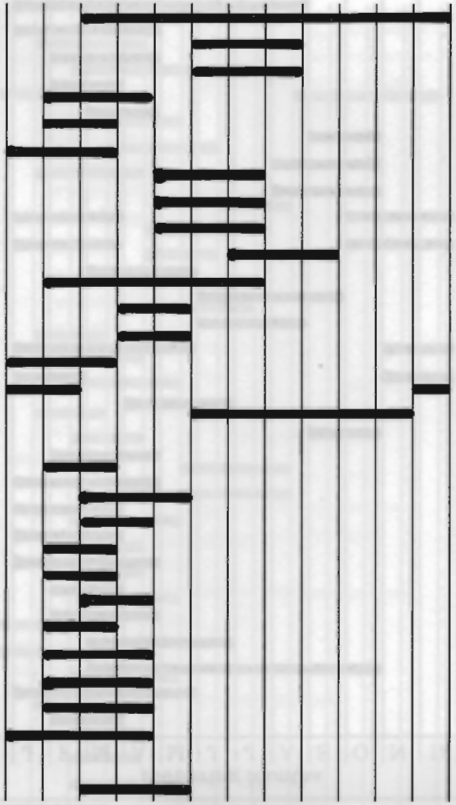

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Table 9.1. Contd.

Plant Species	English Name	Family	Sources	Status	Flowering Months
					J F M A M J J A S O N D
Crataeva religiosa	Garlic pear	Capparidaceae	N	M	
Crocus sativus	Saffron crocus	Iridaceae	P/N	m	
Cynodon dactylon	Bermuda	Gramineae	P	M	
Cucumis sativus	Cucumber	Cucurbitaceae	P/N	M	
Cucurbita maxima	Winter squash	Cucurbitaceae	P/N	M	
Cucurbita pepo	Pumpkin	Cucurbitaceae	P/N	M	
Dalbergia sissoo	Sissoo	Leguminosae	N	m	
Datura metel	Downy	Solanaceae	P	M	
Datura stramonium	Stramonium	Solanaceae	P	M	
Daucus carota	Carrot	Umbelliferae	P/N	M	
Diospyros virginiana	Persimmon	Ebenaceae	N	M	
Eleusine coracana	Finger millet	Gramineae	P	M	
Emblica officinalis	Emblic myrobalan	Euphorbiaceae	N	M	
Eriobotrya dubia	—	Rosaceae	P	M	
Eriobotrya japonica	Loquat	Rosaceae	P/N	M	
Eucalyptus citridora	Eucalyptus	Myrtaceae	P/N	M	
Eucalyptus globulus	Eucalyptus	Myrtaceae	P/N	M	
Eucalyptus robusta	Eucalyptus	Myrtaceae	P/N	M	
Eugenia formosa	—	Myrtaceae	P/N	M	
Eugenia operculata	—	Myrtaceae	P/N	M	
Fagopyrum dibotry	Perennial buck wheat	Polygonaceae	P	M	
Fagopyrum esculentum	Common buck wheat	Polygonaceae	P	M	
Fagopyrum tartaricum	Tatary buck wheat	Polygonaceae	P	M	
Ficus glomerata	Cluster fig	Moraceae	N	m	
Fraxinus floribunda	Ash	Oleaceae	N	m	
Fragaria indica	—	Rosaceae	P/N	m	
Fritillaria cirrhoa	—	Liliaceae	N	m	
Gazania sp.	—	Compositae	P	M	

Grevellia robusta	Silver oak	Myrtaceae	N	M
Hibiscus esculanta	Lady's finger	Malvaceae	P/N	M
Hibiscus rosa sinensis	Chinese hibiscus	Malvaceae	P/N	M
Ipomoea batata	Sweet potato	Convolvulaceae	P	M
Jacaranda mimosifolia	Jacaranda	Bigoniaceae	N/P	M
Jatropa curcas	Physic nut	Euphorbiaceae	N	m
Juglans regia	Walnut	Juglandaceae	P	M
Justicia procumbens	—	Acanthaceae	N	m
Lagenaria leucartha	Bottle gourd	Cucurbitaceae	P	M
Lagerstroemia flosreginae	—	Lythraceae	P	M
Lagerstroemia parviflora	—	Lythraceae	P	M
Lepidium sativum	Garden cress	Cruciferae	N	m
Leucosceptrum canum	—	Labiatae	P/N	M
Lonicera ligustrina	—	Caprifoliaceae	P	M
Linum usitatissimum	Flax	Linaceae	P	M
Litchi chinensis	Litchi	Sapindaceae	N	M
Luffa acutangula	Vegetable songe	Cucurbitaceae	P	M
Luffa cylindrica	—	Cucurbitaceae	P	M
Lyonia ovalifolia	—	Ericaceae	N	m
Maesa chisia	—	Myrsinaceae	P	M
Maesa macrophylla	Pomello	Myrsinaceae	P	M
Madhuca butyracea	Indian butter	Sapotaceae	N	M
Mangifera indica	Mango	Anacardiaceae	P/N	M
Mahonia nepalensis	—	Berberidaceae	P	M
Medicago falcata	Yellow lucerne	Leguminosae	N	M
Medicago sativa	—	Leguminosae	N	M
Melia azedarach	China berry	Meliaceae	N	m
Mimosa pudica	Sensitive plant	Leguminosae	P	M
Mimosa rubicaulis	—	Leguminosae	P	M
Morus alba	Red mulberry	Moraceae	P	M

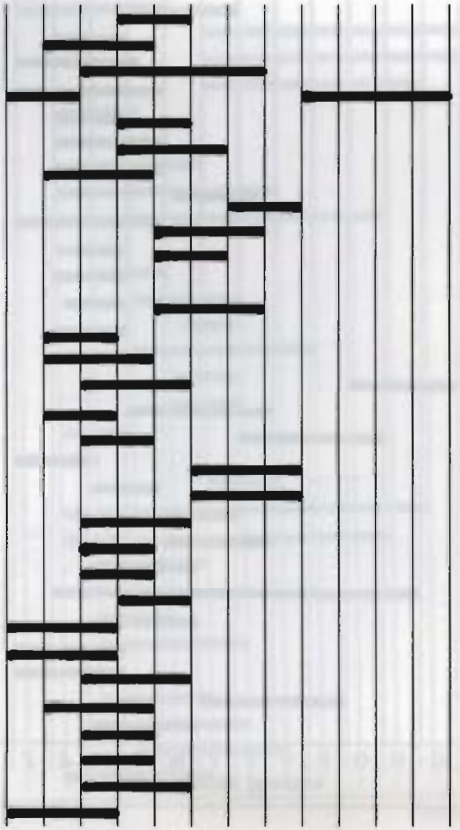

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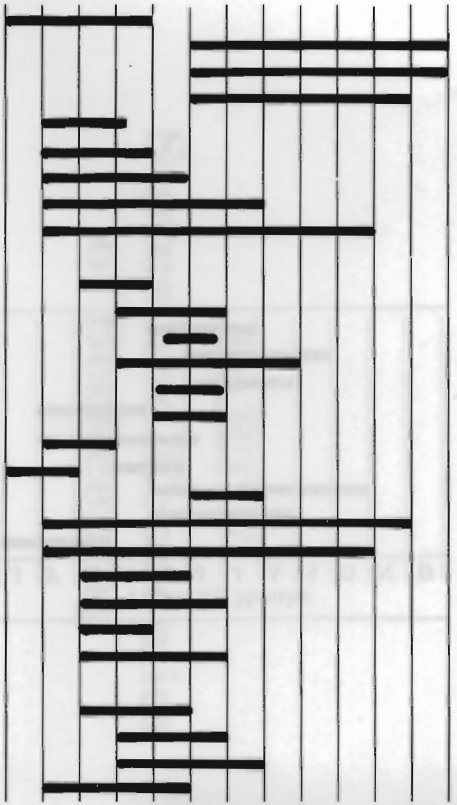
Table 9.1. Contd.

Plant Species	English Name	Family	Sources	Status	Flowering Months
					J F M A M J J A S O N D
Musa paradisiaca	Banana	Musaceae	P/N	M	
Myrica esculenta	Bay-berry	Myricaceae	P	M	
Ocimum basilicum	Basil	Labiatae	N	m	
Ocimum sanctum	Basil	Labiatae	N	m	
Oxalis acetosella	Sorrd	Oxalidaceae	N	m	
Oxalis corniculata	Creeping sorrd	Oxalidaceae	N	m	
Papaver somniferum	Opium poppy	Papaveraceae	P	M	
Phaseolus vulgaris	Kidneybean	Leguminosae	P	m	
Pisum sativum	Garden pea	Leguminosae	N	m	
Pieris formosa	—	Ericaceae	N	m	
Pyracantha crenmulata	—	Rosaceae	N	M	
Poinsettia pulcherima	Poinsettea	Euphorbiaceae	P	m	
Punica granatum	Pomegranate	Myrtaceae	P	M	
Prunus cerasoides	Nepali cherry	Rosaceae	N	m	
Prunus domestica	Plum	Rosaceae	N/P	M	
Prunus armeniaca	Apricot	Rosaceae	N	M	
Prunus amygdalus	Almond	Rosaceae	N/P	M	
Prunus nepalensis	Cherry	Rosaceae	N	M	
Prunus persica	Peach	Rosaceae	N/P	M	
Prunus cornuta	Himalayan cherry	Rosaceae	P/N	M	
Psidium guajava	Guava	Myrtaceae	P/N	M	
Pyrus pashia	Wild pear	Rosaceae	N	M	
Pyrus malus	Apple	Rosaceae	N	M	
Pyrus communis	Nepali pear	Rosaceae	N	M	
Quercus lanuginosa	Wooly oak	Fagaceae	N	m	
Quercus glauca	Blue Japanese oak	Fagaceae	N	m	
Raphanus sativus	Radish	Cruciferae	P/N	M	
Ricinus communis	Castor	Euphorbiaceae	P/N	M	

Rhododendron arboreum	Rhododendron	Ericaceae	N	m
Rhus javanica	Chinese sumac	Anacardiaceae	P	M
Rhus succedanea	Wax tree	Anacardiaceae	P	M
Rhus wallichii	—	Anacardiaceae	P	M
Rosa moschata	Mush rose	Rosaceae	P	M
Rosa alba	Rose	Rosaceae	P	M
Rosa brunonii	Rose	Rosaceae	P	M
Rosa sp.	Rose	Rosaceae	P	M
Rubus ellipticus	Golden evergreen raspberry	Rosaceae	N	M
Salix babylonica	Napoleon willow	Salicaceae	P	M
Sambucus hookeri	—	Caprifoliaceae	P	m
Sapindus mukorossi	Soap nut	Sapindaceae	N	m
Saurauia nepalensis	—	Saurauriaceae	P/N	m
Schima wallichii	—	Theaceae	P	m
Sesamum indicum	Sesame	Pedaliaceae	P	M
Senecio densiflorus	—	Compositae	P	m
Shorea robusta	Sal tree	Dipterocarpaceae	P	m
Solanum indicum	—	Solanaceae	P	M
Solanum nigrum	Black night shade	Solanaceae	P	M
Solanum melongena	Brinjal	Solanaceae	N	m
Spondias axillaris	Nepalese hog plum	Anacardiaceae	N	M
Symplocos paniculata	—	Symplocaceae	P	m
Taraxacum officinale	Pissabed	Compositae	P	M
Terminalia bellerica	Belleric myrobolan	Combretaceae	N	m
Trachyspermum amnia	Ajowain	Umbelliferae	N	M
Trichosanthes anguina	Snake gourd	Cucurbitaceae	P	m
Trifolium repens	White clover	Leguminosae	N	M
Trigonella sp.	Fenugreek	Leguminosae	N/P	m



Contd.

Table 9.1. Contd.

Plant Species	English Name	Family	Sources	Status	Flowering Months
					J F M A M J J A S O N D
Vicia faba	Broad bean	Leguminosae	P/N	M	
Vigna catjang	Cow pea	Leguminosae	P	m	
Vitex negundo	—	Verbenaceae	P	m	
Vitis vinifera	Wine grape	Vitaceae	P	M	
Yucca smalliana	Adam's neddle	Agavaceae	P	M	
Zanthoxylum armatum	Nepal pepper	Rutaceae	P	m	
Zea mays	Maize	Gramineae	P	M	
Zinnia sp.	—	Compositae	P	M	
Zizyphus incurva	Bead plum	Rhamnaceae	N	M	

M = Major, m = Minor, N = Nectar, P = Pollen.