# POSTHARVEST HANDLING OF BANANA IN CHITWAN, NEPAL

**R. C. Basnyat and G. K. Shrestha**
Institute of Agriculture and Animal Science (IAAS)
Central Campus, Rampur, Chitwan, Nepal

## ABSTRACT

**A study on farmers' practices of banana postharvest technology of banana was done during 1993 by surveying a total of 56 growers in Chitwan district. About 90% of the respondent farmers did not receive any training on banana technology; usually they plant banana in early summer and harvest in later part of rainy season when the fruit become smooth, plumpy and ridgeless. Usually farmers adopted traditional postharvest technology using locally available containers and wrapping materials. Thirtynine farmers never used chemicals to ripen banana but 16 farmers used Calcium carbide and one salt water in ordinary room condition. When chemicals were used, ripening of banana (color development) was hastened. Growers indicated that a local variety, 'Malbhog' is superior to other varieties in its quality, taste and storability.**

**Additional Key Words:** *Musa* sp., fruit, harvest, ripening, chemicals, containers

## INTRODUCTION

Banana (*Musa sp.*) is one of the most widely grown tropical fruits. It is extensively grown in Guatemala, Honduras, Mexico, Panama, Brazil, Columbia, Kenya, etc. (Shrestha, 1996). It is also grown in Nepal throughout Tarai and Inner Tarai regions and it is also extended to mid-hill region where climatic conditions favour its growth and development. Most farmers grow local varieties but improved cultivars are also produced in spite of serious pest problems (Thapa, 1993).

Chitwan is a potential district where banana is grown for home consumption as well as for marketing. The cultivation of banana in Chitwan was started as early as 1940 (Shrestha *et al.*, 1994). The statistical data indicated that 113 ha of land in Chitwan are under banana cultivation with a production of 2034 t. Initially, farmers used to allocate small patch of land to banana growing. However, there is an increasing trend of demand for banana by urban and rural people, the area under its cultivation is expanded but farmers do not have appropriate skill and production technology. Gautam *et al.* (1994) reported that the local cultivars dominated over the improved ones in production; because, the latter cultivars have more pest attack and less storability. The objectives of this study were to find out the farmer's technology used in harvesting, ripening and storing bananas in Chitwan.

## MATERIALS AND METHODS

The study was carried out in Chitwan district of Nepal in 1993. Fifteen Village Development Committees (VDCs) and one Nagar Development Committee (NDC) such as, Bharatpur (NDC), Gunjanagar, Mangalpur, Meghauli, Shukranagar, Sharadanagar, Dibyanagar, Phulbari, Shivanagar, Parwatipur, Gitanagar, Patihani, Panchakanya, Ratnagar, Kabilas, and Jagatpur were included in the study.

A total of 56 households were selected randomly from 300 households who planted banana at least in proportionate allocation of their crps. Survey was conducted by using a pre-tested structured questionnaire. The numbers of farmers selected for interview depended on the numbers of banana grower in that particular village development committee. The selected farmers either men, women or both were interviewed for banana planting seasons, appropriate time of harvesting, method to enhance banana ripening along with the containers and wrapping materials. Farmers were also asked if they used chemicals for hastening color development of fruits. Farmers were also asked about the price of bananas and disease and pest problems. The data obtained were analyzed for presentation.

## RESULTS AND DISCUSSION

### Harvesting

Farmers planted banana more (79.5%) in marginal, uplands or sloppy areas than in irrigated land. About 68% of farmers planted banana during early summer, this ensures them that harvesting could be done during the later part of next rainy season so that banana harvesting matches with festival periods (such as Dashain or Bhai Tika) to catch market (Table 1). Because, planting time, sucker size, care and management practices affect harvesting time.

Table 1. Planting and harvesting time of banana (N = 56) in Chitwan, 1993.

| Time | Planting | | Harvesting | |
|---|---|---|---|---|
| (Season) | Frequency | Percentage | Frequency | Percentage |
| Early summer | 38 | 67.9 | 11 | 19.6 |
| Late rainy period | 11 | 19.6 | 39 | 69.7 |
| Winter | 4 | 7.1 | 4 | 7.1 |
| Not fixed | 3 | 5.4 | 2 | 3.6 |

Planting in winter was less than 10% so was the harvesting. Majority of the farmers (69%) preferred harvesting banana when the fruits became smooth and flattened ridges (Table 2). They also harvested at other stages but to a lesser extent. But most farmers did not care about the time of emergence of flower panicle, which may be a determining factor in banana production. This indicates that as in some other fruits like apple the days after anthesis is not considered as a harvest index in banana by farmers of Chitwan. Perhaps smooth, flattened ridges and plumpiness of fruits are the most useful harvest indices.

### Ripening

For ripening, 75% of the respondents kept banana hands for ripening. Most farmers reported that they kept bananas in the sun for some time to dry the liquid exudate and fasten ripening process. Some (14% farmers) did not dry hands but very few respondents reported that they put the hands in shade for some time. Many kinds of containers are being used by farmers to keep the hands. Out of these, gunny or plastic bags (34%) and keeping in the pit (23%) were major ones (Table 3). Locally available various other containers used were *Doko, Ghyampo, Cupboard, Drum*, etc.

Table 2. Appropriate time of harvesting banana (N = 56) in Chitwan, 1993.

| Time and stage of harvesting | Frequency | Percentage |
|---|---|---|
| Time after emergence of panicle | | |
| Unknown | 53 | 91.1 |
| After 90 days | 3 | 9.9 |
| Stage | | |
| Harvesting stage unknown | 3 | 5.4 |
| When fruits become smooth and less ridged | 39 | 69.6 |
| When fruits become yellow | 7 | 12.5 |
| Both smooth & less ridged and yellow | 7 | 12.5 |

Table 3. Containers and wrapping materials used for ripening of banana (N = 56) in Chitwan, 1993.

| Methods used for ripening | Frequencies | Percentage |
|---|---|---|
| Containers used | | |
| Bora (jute, plastic bags) | 19 | 33.92 |
| Pit | 13 | 23.41 |
| Doko, Dalo, Thunche | 9 | 16.07 |
| Bora and Ghyanpo | 5 | 8.92 |
| Doko and Bora | 4 | 7.14 |
| Never (No container) used | 2 | 5.57 |
| *Others | 4 | 7.14 |
| Wrapping material used | | |
| Never used | 15 | 26.78 |
| Paral (paddy straw) | 12 | 21.42 |
| Bakaino (Chinaberry) leaves and Bora | 9 | 16.07 |
| Asuro (Malabar nut) and Ghokre leaves | 8 | 14.28 |
| Bhus (rice husk) | 5 | 8.92 |
| Dhurseli leaves (local plant) | 3 | 5.35 |
| **Others | 4 | 7.13 |

* Mud and metal ghyampo, wooden cupboard, tin, drum, clothes and ** sirish, rudilo and koiralo (names in Nepali).

About one-fourth of respondent farmers never used plant materials for wrapping the banana hands while others reported that they have used dry rice straw (21%), *Bakaino or Bora, Asuro, Bhus, Dhurseli*, etc. It was found that the plant material such as the leaves are characteristically soft with bristles or hairs that ensure warmth during the process of ripening.

The use of chemicals for ripening banana especially calcium carbide after harvest, was also recorded; however, most farmers (70%) reported that they had never used chemicals. It was interesting to know that one farmer dipped bananas in salt water solution

Table 4. Time taken for ripening banana after chemical treatment Chitwan, 1993.

| Time taken (Days) | Frequencies | Percentage |
|---|---|---|
| Ripening time in summer with chemical (N=16)* | | |
| Two days | 14 | 87.50 |
| More than two days | 2 | 12.50 |
| Ripening time in summer without chemical (N=56) | | |
| Two days | 10 | 17.86 |
| More than two days | 36 | 64.28 |
| Unknown | 10 | 17.86 |
| Ripening time in winter with chemical (N=56) | | |
| Two days | 12 | 21.42 |
| More than two days | 2 | 3.58 |
| Unknown | 42 | 75.00 |
| Ripening time in winter without chemical (N=56) | | |
| Four days | 9 | 16.08 |
| More than four days | 33 | 58.92 |
| Unknown | 14 | 25.00 |

* Only 16 farmers have used chemicals for enhancing ripening of banana.

Table 5. Market value of banana (Rs/100 finger) (N=56) in Chitwan, 1993.

| Value (Rs) | Frequencies | Percentage |
|---|---|---|
| Malbhog (ripened) | | |
| Consumed at home | 41 | 73.21 |
| 50-75 | 10 | 17.85 |
| 80-125 | 5 | 8.94 |
| Malbhog (unripened*) | | |
| Consumed at home | 28 | 50.00 |
| 20-50 | 19 | 33.92 |
| 62-105 | 9 | 16.08 |
| Other species (ripened) | | |
| Consumed at home | 47 | 83.92 |
| 40-50 | 5 | 8.93 |
| 60-85 | 4 | 7.15 |
| Other species (unripened*) | | |
| Consumed at home | 35 | 62.50 |
| 20-50 | 14 | 25.00 |
| 60-100 | 7 | 12.50 |

* Unripened bananas also used to consume at home as vegetable, and chutney mixes.

for ripening (Basnyat *et al.*, 1996). The use of chemicals for ripening banana was to ensure and enhance timely, yet properly colour changes within two days during both the summer and winter periods (Table 4). But it took more than two days to change the colour when chemicals were not used. However, farmers reported that the taste of chemical-treated banana was flat as compared to the untreated ones.

Most farmers (50 to 84%) reported that they did not sale bananas and used for their home consumption. Probably, these farmers did not have large area under banana plantation. However, many others sold their produce in the markets with available price ranging from Rs. 20 to 125 per 100 fingers (Table 5). The ripened bananas fingers used to sun dry and then these fingers cut into pieces and chew as luxative products in some ethnic groups like Darais and Tharus. Irrespective of varieties, in general, the unripened bananas had comparatively less price than the ripened ones. Between the ripened and unripened bananas of Malbhog, the price was higher for the former than the latter.

In most cases, the present methods of banana harvesting, ripening and storing techniques adapted by farmers are justifiable mainly because of small scale production, easily marketing of the produce (Basnyat *et al.*, 1996). However, research is needed on harvesting techniques, ripening methods and procedures and packaging, transportation and marketing of banana when improved varieties are produced by the farmers in large scale.

## ACKNOWLEDGEMENT

The authors acknowledge Dr. Resham B. Thapa and Mr. Purandhar Dhital for their timely help during the course of study and data analysis. Research supports were received from the Directorate of Research, Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.

## REFERENCES CITED

Basnyat, R. C., G. K. Shrestha, P. Dhital and R. B. Thapa. 1996. Socio-economic conditions of the banana growers and their practices in banana production, handling and marketing in Chitwan District - A case study. Research report submitted to the Directorate of Research, Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.

Gautam, T., G. K. Shrestha, F. P. Neupane, J. Timsina and P. Dhital. 1994. Production and marketing banana: A case study of Kabilas Village Development Committee, Chitwan, Nepal. FSR Series No.5. Directorate of Research. Institute of Agriculture and Animal Sciences, Rampur, Chitwan, Nepal.

Shrestha, G. K. 1996. World commercial fruits at a glance. Technica Concern, G.P.O.Box 3602, Kathmandu, Nepal.

Shrestha, G. K., R. B. Thapa, D. R. Baral and R. R. Pokharel. 1994. Banana research in Chitwan, Phase I: Observation and establishment of banana nursery at IAAS, Rampur. IAAS Research Reports (1992-1993):88-99. Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.

Thapa, R. B. 1993. Survey and identification of major insect pest problems in banana in the Chitwan valley, Nepal. IAAS Research Reports (1992-1993):66-69. Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal.