Report on the bamboos of Pipar

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PIPAR BAMBOOS 25th November 1983.

1. Introduction

Report from C. Stapleton and S. Tamrakar of the Forest Survey and Research Office, Department of Forests, HMG Nepal following a visit to Pipar area and Lumle Agricultural Centre to assist in the WPA-funded investigations of N. Picozzi of the Institute of Terrestrial Ecology, Natural Environment Research Council.

Four days were spent in the proposed reserve area, allowing a generalised picture of distribution and management to be obtained from a large area with great altitudinal variation. Identification of species will follow a detailed examination of collected material.

2. Species Distribution

The high rainfall of this area and the relatively intact natural vegetation allow a wide variety of natural bamboos to be found, more than in any other area of Nepal so far studied. There are five species of Arundinaria (sensu lato) which form a major understorey component of the vegetation, and probably two or three more which are occasional. The five major species follow a largely altitudinal sequence in the area, table 1.

Local name	Approximate altitudinal range, ft/m
jarabutto	12,500 - 9,500 / 3,800 - 2,900
chigar	10,000 - 8,500 / 3,050 - 2,600
malinge nigalo	9,000 - 7,500 / 2,700 - 2,300
ghore nigalo	8,000 - 6,000 / 2,400 - 1,800
tite nigalo	7,500 - 4,500 / 2,300 - 1,400

Table 1. Zonation of major bamboo species.

Ghore is the least abundant of these five species, occuring in the ranges of both tite and malinge nigalos. Chigar extends down into the belt of malinge in the driest sites, e.g. spurs at 8,500 ft. How far the malinge extends up into the less accessible moist gulley sites needs to be studied further. Jarabutto is found as isolated thickets on open grassland and as dense young regeneration under rhododendron and berberis forest and scrub.

In addition to these, ghopi bans is reported to occur occasionally around 5,500 ft (nth of siano khobang) and dyo nigalo is reported to occur around 10 - 11,000 ft on steep slopes outside the reserve and may possibly occur within it. Tite nigalo most probably represents two species in the reserve, as it does in nearby areas, with one dominant species. These occurrencies also require further investigation. Thus there may be a total of eight species in the reserve, although only five are major components of the vegetation. Arundinaria maling Gamble, usually

known as malingo rather than malinge nigalo, has not been seen in the area.

3. Recognition

For quick recognition culm and leaf sheath features are most useful. Culm sheaths may have disintegrated by spring, however, making recognition difficult until sheaths develop on new shoots in late summer. Leaf sheath auricles and setae may be deciduous. This is especially so in ghore at the upper end of its range. Typical bamboo culm sheaths and leaf sheath appendages are described in figure 1. A brief table of these and other useful features for the species is given below, table 2. The characteristics of dyo nigalo are not known. Seven species can be separated using the key provided.

4. Flowering

During discussions with guards, bamboo cutters and farmers, conflicting reports on past flowerings were received, which is not surprising considering the variety of species present. Young plants of tite nigalo and jarabutto were found, indicating flowerings about 3 - 8 years ago. No evidence was found of recent flowerings in malinge nigalo or the other species. Flowerings were reported to be gregarious, i.e. all clumps of the relevant species flowered, but with this taking place over several years and with different sites flowering in successive years. Isolated clumps of jarabutto can be seen which either have not flowered at all, or did not die after flowering, while those plants which are much closer together under the tree canopy have all flowered and died, producing a thick growth of regeneration.

5. Management

Grazing pressure exerts the greatest influence on the bamboos. Past sporadic burning would have had little direct effect as rhizomes can grow new shoots after a fire. All species seem to be capable of growing well without tree cover in their natural sites. Because of their palatibility the clumps are heavily grazed in clearings resulting in their reduction or elimination after several years. Natural flowering and regeneration patterns are seen to be completely different when the continuous forest understorey is modified into a pattern of separated and exposed clumps in open grazing land.

Harvesting patterns seem reasonable in the malinge nigalo in the one site studied intensively. The age class distribution showed that nearly all shoots had been removed for human consumption in 1982 while none had been removed in 1983. Because of the large demand for high quality second-year poles for basketwork and matting it is reported that exploitation of new shoots has stopped, under the directives of the local authority, and extraction of poles is controlled by the levying of a duty on each bundle carried. Such control measures seem feasible, because of the limited access available to the area, which channels all entrants through Karuwa village and bridge, and the vested interests of the local inhabitants.

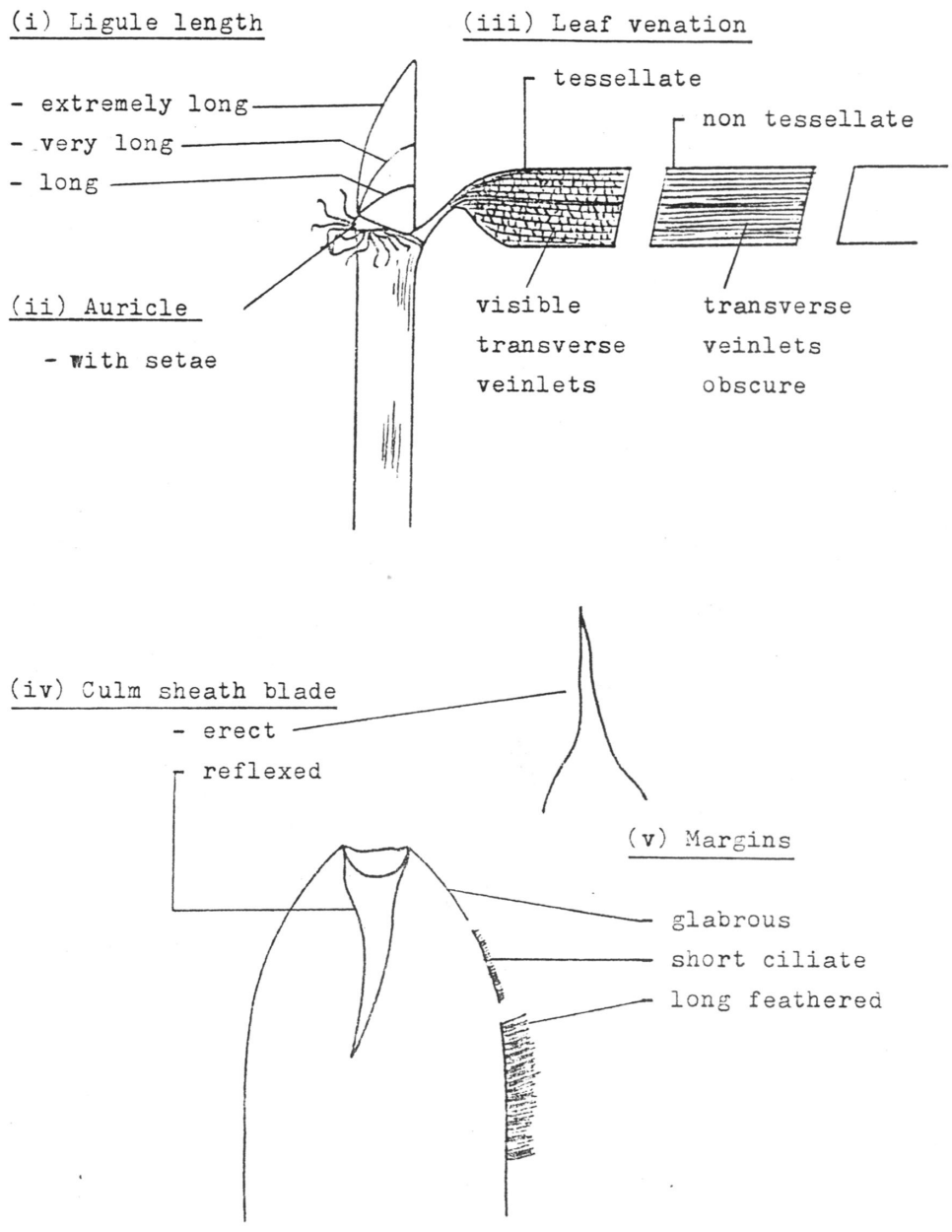
Table 2. Principle vegetative features for identification of Pipar bamboos

	Tite 1	Tite 2	Chore	Malinge	Chigar	Jarabutto	Ghopi bans
1. Culm sheath							
1.1 blade (from mid-culm sheath)	always reflexed	always reflexed	always reflexed	usually erect	always erect	usually erect	usually reflexed
1.2 interior texture	rough at top	rough at top	smooth	smooth	smooth	smooth	smooth
1.3 exterior texture	rough at top	smooth	rough esp. top edges	smooth	rough with short hairs	smooth	rough
2. Leaf sheath							
2.1 ligule	long, glabr--ous	extremely long, glabr--ous	long, pubes-cent	long, pubes-cent	extremely long, glab-rous	long or very long, pubesc--ent	longor very long, fimbri--ate
2.2 auricles	absent, no setae	persistent, long setae	deciduour, setae	absent, no setae	absent, no setae	absent, no setae	absent, no setae
3. Leaves							
3.1 venation	non-tessellate	non-tessellate	non-tessellate	non-tessellate	tessellate	tessellate	non-tessellate
4. Culm							
4.1 internode length	less than 30 cm	less than 30 cm	less than 30 cm	less than 45 cm	less than 25 cm	less than 25 cm	less than 45 cm
5. Other distinctive features			buds swollen like knees		curving culms		long feathered culm sheath margins leaves < 40 cm

Simple key to distinguish Arundinaria species of Pipar

1. Leaf tessellate 2
1. Leaf not tessellate 3
2. Culm sheath exterior very rough with short hairs..... chigar
2. Culm sheath surfaces both smooth ..... jarabutto
3. Culm sheath with very long feathered margins at top ..... ghopi bans
3. Culm sheath with glabrons or short-ciliate margins 4
4. Culm sheath interior rough 5
4. Culm sheath interior smooth 6
5. Leaf sheath ligule long ..... tite 1
5. Leaf sheath ligule extremely long ..... tite 2
6. Culm sheath exterior rough especially edges at top ..... ghore
6. Culm sheath exterior very smooth ..... malinge

Figure 1 Leaf and culm sheath morphology



Conversion of poles into weavable strips takes place on-site. Removal of poles intact would involve extreme difficulties because of the difficult terrain. Removal of high quality second year shoots (over 90% of total second year numbers), in the winter of the second year is a sound management practice which maintains clump vigour and provides a sustained yield. Removal of new shoots, however, can result in death of the clump if repeated over several successive years. Removal of a small proportion each year in combination with pole production is feasible and is practiced in Japan and China. This, however, requires stricter controls then may be possible under communal ownership. Cutting of shoots for immediate consumption by herders is also very difficult to control. Chigar is occasionally cut for weaving on a very small scale, either by mistake or for very basic standard weaving requirements of passing herders. Apart from the manufacture of brushes from the branches this species has very little utility indeed and is rarely cut for poles or fodder.

6. Utility as Cover for Pheasants

The clump size, development and distribution of the different species affect the relative value of the ground cover provided. The lower altitude species are taller and grow in well spaced clumps of densely packed poles which pheasants cannot enter, leaving large areas of open ground under dense shade between impenetrable thickets. The chigar, by comparison, grows in more open, smaller clumps. Pheasants can get through the well-spaced poles, which arch and spread more widely giving a better degree of protection between the clumps as well. The jarabutto forms very dense small upright clumps which are close together when mature. The low stature and closeness of clumps gives dense cover right to the ground. The foliage of this species being lower down is more available as food. The bamboos provide protection through the winter, as they do not die back with the herbaceous ground cover. Thickets of bamboo also provide food and cover for many other birds and animals notably the Himalayan black bear which eats the young shoots.

7. Propagation Potential

Tite nigalo is commonly propagated and planted from 3,000 to 6,000 ft. Ghore is also planted in small numbers. The malinge nigalo offers good prospects for propagation. Unlike the malingo bamboo of eastern Nepal, the rhizomes are short and compact, allowing easy extraction and planting. As it fits into this short-rhizomed category of bamboos, propagation from culm and branch cuttings is also feasible. It evidently requires a cool moist site for establishment and successful development of high quality poles. As its natural range extends down to about 7,500 ft only it is probably unlikely to grow well below 6,000 ft, but it is likely to be very useful in moist gulleys from 6,500 to 7,500 ft.

8. Summary

There is an unusually large variety of bamboos of the genus Arundinaria in the reserve area, which is in a region of very high rainfall. Five species constitute major components of the understorey vegetation, producing on almost contiguous bamboo ground cover from 4,500 to 12,500 ft. The different species can

be recognised by vegetative features. The lowermost and uppermost species have flowered and regenerated in recent years. One species only, malinge nigalo, is harvested for weaving material for a major and expanding cottage industry, as well as for edible shoots on a small scale. The present harvesting practices are satisfactory in the small area studied and allow for a sustained yield. Livestock grazing pressures in the upper areas, however, are reducing the numbers of clumps and seriously affecting flowering and regeneration in the highest altitude species, as well as causing localised destruction of bamboo along movement routes taken in autumn and spring lower down the mountain. The upper two species chigar and jarabutto provide better cover for pheasants than the lower nigalos. The potential for propagating malinge nigalo outside the reserve is good, provided that suitable sites can be found. Dry and low-altitude sites will not be suitable , gulley sites between 6,000 and 7,500 feet being most likely to produce good quality poles. If the proposed reserve area can be maintained in an ecologically sound state it will have great intrinsic value through the conservation of an exceptionally well-developed and varied bambusoid flora.