

PRODUCTION STUDIES OF IMPORTANT RANGELAND SPECIES OF AZAD KASHMIR

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Summary

Nomadic grazing is the foremost cause of range deterioration in Azad Kashmir. "Bakar-wals" migrate to upper Neelam Valley in search of food for their livestock in summer while move down to southern parts of the same valley during winter. Present studies were carried out not only to estimate productivity of the most important forage species occurring in these valleys but also suggest the best use of these species in the correct season of grazing. Productivity and phenological studies involved important forage species such as *Dactylis glomerata*, *Festuca elatior*, *Festuca arundinacea*, *Phalaris tuberosa*, *Sorghum halepense*, *Lolium multiflorum*, *Lolium perenne*, *Trifolium pratense*, *Trifolium repens* and *Vicia* spp.

Introduction

Azad Kashmir is situated in the northern and north eastern part of Pakistan and lies between 20–40° N latitude and 73–75° E longitude. The tract has an area of about 11640 sq. kilometers (4494 sq. miles) and has a population of 1.806 million.

Climate

It is a mountainous tract with altitude ranging from about 400 meters to over 6000m. The principal form of precipitation in the Neelam Valley and greater part of Poonch, is snow with winter rains, while the remaining areas receive maximum precipitation in the form of rains during monsoon, although heavy showers may occur at any time of the year. Rainfall ranges from 900mm in the lower hills of Mirpur district to about 1500mm at higher elevations in Muzaffarabad district.

Land use

The table below gives the area statistics by classes (Amjad, 1980).

	Area (Thous. hect)	Percent of (Total land area)
Total land area	1164	—
Area under the control of forest department	582.7	48.9
Rangelands	202.3	17.37
Production Forests	169.8	14.3

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Ninety percent of the population lives in rural areas and depends on primitive agriculture and animal husbandry for living, therefore, the grazing lands of Azad Kashmir constituting 17 percent of the total land area, are a big natural resource and on their proper utilization depends the living and prosperity of large proportion of the people. The wooded forests (mostly coniferous constituting 31 percent of the land area) are being deforested to varying degrees and posing special problems. Due to uncontrolled cutting of trees, lopping and encroachments, deterioration of habitat, disturbance of watersheds, erosion and loss of productive top soil, have taken place. Similarly the agricultural practices in the hilly country of Azad Kashmir are not less than were misuse of land. Due to extremely small holdings, slopes upto 80° have been brought under cultivation in a desperate effort to earn some livelihood.

Though the livestock population has not increased considerably but the problem of nomadic grazing is severe in Azad Kashmir. The main tribe involved in the migration upto Neelam Valley are the "Bakarwals". Their summer grazing is confined to the upper Neelam Valley while the lower valleys of south Mirpur and Jhelum are used as winter grazing grounds. Many of them across the Jhelum river at Azad Pattan and move down through Sudden Gali, Bagh, Hajira and Kotli. It is estimated that over one million goats and 0.5 million sheep move in search of good quality forage while on their march to alpine pastures up to Neelam Valley or coming to lower areas in winter.

Livestock population

The table below gives the livestock population (in millions) in Azad Kashmir (Amjad, 1980):

S.No. Class	Years		
	1960	1972	1976
1. Buffaloes	0.2	0.2	0.3
2. Cattle	0.4	0.4	0.4
3. Sheep	0.2	0.2	0.1
4. Goats	0.2	0.4	0.5
5. Camels, Horses etc.	—	0.07	0.02
Total	1.00	1.27	1.32

It is evident from the above table that there has been stagnation in the cattle population while buffaloes have shown only on annual increase of 3.12 percent whereas sheep have shown a downward trend. This means that major milk and meat producing animals are increasing only at the rate of two percent each year against an annual increase of 3.5 percent in the human population.

Since there is lack of availability of sufficient quantities of forage and fodder, therefore, the yield of milk and meat per animal is difficult to increase. The relative increase in the number of goats as compared to sheep, cows and buffaloes is not a good sign. With the decline in the nutritional status of vegetation, the goats have increased at the cost of other animals

as they are more agile and mobile and can travel over larger distances and make use of the roughage including bushes and thorny and bitter plants that are not relished by cattle and buffaloes or even sheep.

Phenological and production studies of Range Species

Trials to study the phenology, vigour, seed and forage production of grass species were conducted in wet temperate zone at Dungan at an elevation of 2300 meters and in subtropical subhumid zone at Damrooli at an elevation of 900 meters. Based on the performance of each species in its respective ecozone, the following recommendations of range improvement and range utilization are given species wise alongwith its characteristics. The ecological classification used in the following pages for rangelands of Azad Kashmir, has been adopted from Khan, 1973.

Dactylis glomerata

It is a longlived perennial and cold tolerant. Observation made at Dungan indicated loss of green colour at -5° C. It grows best in loamy soils. Its yield ranges from 400–450 kg dry matter per hectare and seed production varies from 150–175 kg per hectare.

It should be seeded in early spring in wet temperate and subalpine zones. It should be grazed early and intensely to prevent it from maturing because the stems become coarse and unpalatable towards the end of the season. The first crop yields large quantity of seed but fewer green leaves and subsequent crops give both large quantities of green fodder and seed. Studies on continuous close grazing at Dungan research station showed thinning of sod and reduced root development resulting in slow renewal growth. It is obvious that this green suffers under continuous close grazing and hence is not recommended.

Festuca elatior

It produces a sturdy sod due to extensive root system and can withstand grazing in wet weather without injury to the soil. The young plants produce abundant bottom leaves. The plant makes rapid growth when temperature rises above 5° C. It shows vigorous growth in medium to heavy textured soils. Its yield ranges from 1800–2000 kg of dry forage per hectare and seed production varies from 350–450 kg per hectare.

The palatability of this grass is best when utilized in the young vegetative stages or in dry form but is not relished by the livestock in the middle of the season due to coarse leaves and stems. The hay from this species is coarse and lacks in palatability. It should be cut before blooming if it is to be used for hay.

Festuca arundinacea

It is a vigorous perennial and cold resistant. It grows and remains green till snowfall. It has a deep extensive root system and is very valuable for soil conservation and improvement. It prefers medium to heavy textured soils than sandy or gravelly types. Its yield ranges from

1600–1800 kg dry matter per hectare and seed production varies from 100–150 kg per hectare.

It is often rejected by the livestock due to coarse leaves with sharp edges and stems particularly during hot and dry growing periods. However, it is more readily accepted by the livestock during cloudy, rainy and cool weather when it improves in succulence.

Phalaris tuberosa

It is cool season perennial. It forms a heavy tough sod with culms tall and coarse. It is very much suited to eroded lands and for gully control because of its strong sod forming characteristic. It grows very good on well drained soils. It thrive equally good on wet and dry soils. Its yield ranges from 2500–2800 kg dry matter per hectare and seed production varies from 200–250 kg per hectare.

Its first crop is coarse and hence early harvesting is necessary to reduce this undesirable characteristic. The second crop is finer stemmed, soft and more leafy. Early cut grass is palatable for livestock but late cut material being coarser, is suited for horses and asses etc. It is acceptable to all livestock if kept below 30 cm. Cattle and horses graze it readily but sheep prefers other-grasses if a choice is given.

Sorghum halepense

It is a vigorous perennial and produces large and tenacious rhizomes. It grows well at high temperature. It performs well in subtropical humid zone. It is best suited for eroded lands and gully control. Its yield range from 2500–2800 kg per hectare of dry forage while the seed production varies from 1000–1200 kg per hectare. Its yield decreases from $\frac{3}{4}$ to $\frac{1}{2}$ if it is cut in the middle of the summer. It is better to give it a chance to build rhizome reserves untill about mid summer for getting superior yield.

Lolium multiflorum

It is a cool season bunch grass of alpine pastures. The grass is extremely cold resistant and remains green quite late, in winter till it becomes dormant under snow. It resprouts immediately in spring after the snow melt. the problem of non-availability of winter feed in Azad Kashmir can be solved by large scale introduction of this species and the grazing period can be enhanced for two months till December.

It is a highly palatable grass relished by all classes of livestock. Its yield ranges from 1500–1700 kg of dry matter per hectare and seed production varies from 100–150 kg per hectare. The hay can be made from one to two cuttings. The growth becomes stunted and yield decreases after 3–4 cuttings. However, the yield can be improved if nitrogen fertilizer is added or grown with a legume crop.

Lolium perenne

it is very closely related to *Lolium multiflorum* in all aspects. Its yield ranges from 1600–

1800 kg per hectare and seed production varies from 125–160 kg per hectare.

Trifolium pratense

It is a perennial and rapidly spreading species. It can best be adapted from subtropical humid zone to the alpine pastures in Azad Kashmir. It has most satisfactory growth in deep well drained soils rich in organic matter and heavy in texture. It keeps on reseeding naturally when once established. However, high seeding rate is required in wet temperate zone because most of the seed is washed away due to heavy showers and hailstorms. Its per hectare production varies from 1800–2000 kg dry matter and the seed production varies from 35–45 kg per hectare.

It is highly palatable to cattle. It is better to cut the first crop at an early stage and second cutting at full bloom in order to get the highest yield. It makes a better quality hay. The graziers in Neelum Valley have recognized this species as a forage of real value due to its spread and development.

Trifolium repens

It is a perennial clover which spreads readily wherever there is adequate moisture from subtropical humid to alpine zones. It is very nutritious and palatable at all stages of development and all kinds of livestock relish it but preferably by cattle and sheep. Maximum yield is obtained when it is cut in full bloom and per hectare production ranges from 1500–1700 kg and seed production varies from 20–30 kg per hectare. Its feeding value is changed very little from young to the bloom stage. Since it flowers throughout the year, therefore, bees find a good supply of nectar in the flowers and show a preference of it over many other flowers.

Vicia spp.

The two species of vicia viz., *V. sativa* and *V. dasycarpa* are important species for the rangelands of Azad Kashmir. They are viny and weak stemmed and hence can be grown as epiphytes particularly in the subtropical humid zone. They are important for cover, green manure and soil improvement and also make good quality hay. Since these are viny, therefore should be sown with other species to get erect holding support.

The per hectare production of dry forage varies from 700–900 kg and seed production ranges from 20–28 kg per hectare. Seed production in the wet temperate zone is poor as compared to other ecozones. In the subtropical humid zone, two cuttings can be obtained before final cutting or seed maturity.

Recommendations:

All the rangelands of Azad Kashmir should be developed and managed primarily for livestock production consistent with multiple land use concept. It is recommended that the species should be reseeded under the supervision of Neelum Valley Range Land Scheme and reseeding targets be assigned to each forestry division. Since the people have unlimited grazing

rights, therefore, dedicated and trained workers are required to educate people to graze rangelands on scientific principles coupled with provision of better animal health services allied to annual production including the associated fields of hides, skin and wool improvement. However, nominal grazing fees should be charged from nomadic graziers and their grazing be regulated to decrease the pressure from specific areas.

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