

EFFECT OF HARVESTING FREQUENCY ON FORAGE YIELD

Abdul Aleem and M. Noor*

Summary. Studies were conducted at Range Research Nursery, Pakistan Forest Institute, Peshawar during 1977-78 to determine the effect of harvesting frequency on Napier hybrid bajra (fortnightly, monthly, bimonthly and final) and *Vicia sativa* (monthly, 1-1/2 monthly, bimonthly and final). Final harvest produced significantly more forage as compared to monthly and bimonthly (Napier hybrid bajra) and 1-1/2 monthly and bimonthly (*Vicia sativa*) harvests (0.05 level). Highly significant (0.01) results were obtained in case of fortnightly (Napier hybrid bajra) and monthly (*Vicia sativa*) harvests as compared to final harvests.

Introduction. The effects on growth and forage yield of forage/fodder species of Pakistan as exerted by the harvesting conditions are not available. A study was started to determine the effects of harvesting frequency (correlated to clipping treatments) on the forage yield of Napier hybrid bajra and *Vicia sativa*.

Review of literature. Defoliation exerts pressure on the forage yield in varying proportions. Contradictory reports have, however, been made in the world literature on the subject. Most of the studies reported have shown the detrimental effects of repeated (frequent) harvests, whereas some authors have established beneficial effects of repeated harvests as compared to single harvests on the forage yield.

Short grass plains vegetation gave 48% less dry matter yields when clipped at the end of the season as compared to 2-week intervals (Eck et al. 1975). An increase in the forage yield due to repeated clippings was also reported by Hopkins (1958); Klipple and Costello (1960); and Reedon Owyer (1971) (cf. Eck et al. 1975). The lower yield from the single harvest was considered to be a result of decomposition and disappearance of forage produced earlier in the season than of increased growth with clipping or decreased growth with delayed harvest.

Julander (1968) observed substantially greater average annual herbage yield from unclipped range forbs than those clipped 50%, and two or more times greater than plants clipped 75 and 90%. Based on the results of a 10 year study Murphy and others (1969) reported that the 1, 2 and 4 week clipping intervals & generally gave less annual grass yields (showing similar trend) in most years than the unclipped treatments, whereas yield from sub-clover was not affected by any of the treatments (clipping after 1, 2, 4 and or 6 weeks).

The herbage yields in big blue stem (*Adropogon gerardi*) declined linearly with increasing clipping frequency (Owensby et al, 1974). Unclipped plots yielded significantly more herbage as compared to clipped ones. Plots clipped 5 times yielded less herbage than did those clipped 1 or 3 times. Plots clipped 1, 2, 3 or 4 times had almost similar herbage yields.

*The authors are Range Management Officer, and Research Officer respectively at the Pakistan Forest Institute, Peshawar.

Blue grama (*Bouteloua gracilis*) produced more forage when unclipped as compared to the clipping treatments of 10 and 20 days frequency (Bekele et al. 1974).

Singh and Mall (1976) reported more forage yield from *Andropogon pumilus* when clipped at an interval of 45 days as compared to 15 days and 30 days intervals. They also referred to the similar results reported by Albertson et al (1953), Aldon (1930) and Stoddart (1946). Treatments producing high forage yields likewise produced high seed yields, increased clipping frequency decreasing both the number of spikes and the number of caryopsis spikes.

Pangburn switchgrass (*Panicum virgatum*) tolerated one clipping during the season with little or no reduction in forage production whereas two or more clippings significantly reduced it (Beaty and Powell, 1976).

Study area. The study was conducted at Range Research Nursery, Pakistan Forest Institute, Peshawar, elevation 350 m, av. annual rainfall 350 mm, mean maximum and minimum temperatures varying from 40.6°C in June to 4.4°C in January. The soil in the nursery is deep clay loam. Irrigation is provided through tubewell water or canal water which contains silt from the Kabul River catchment. Occasionally sewage water is also used for irrigation.

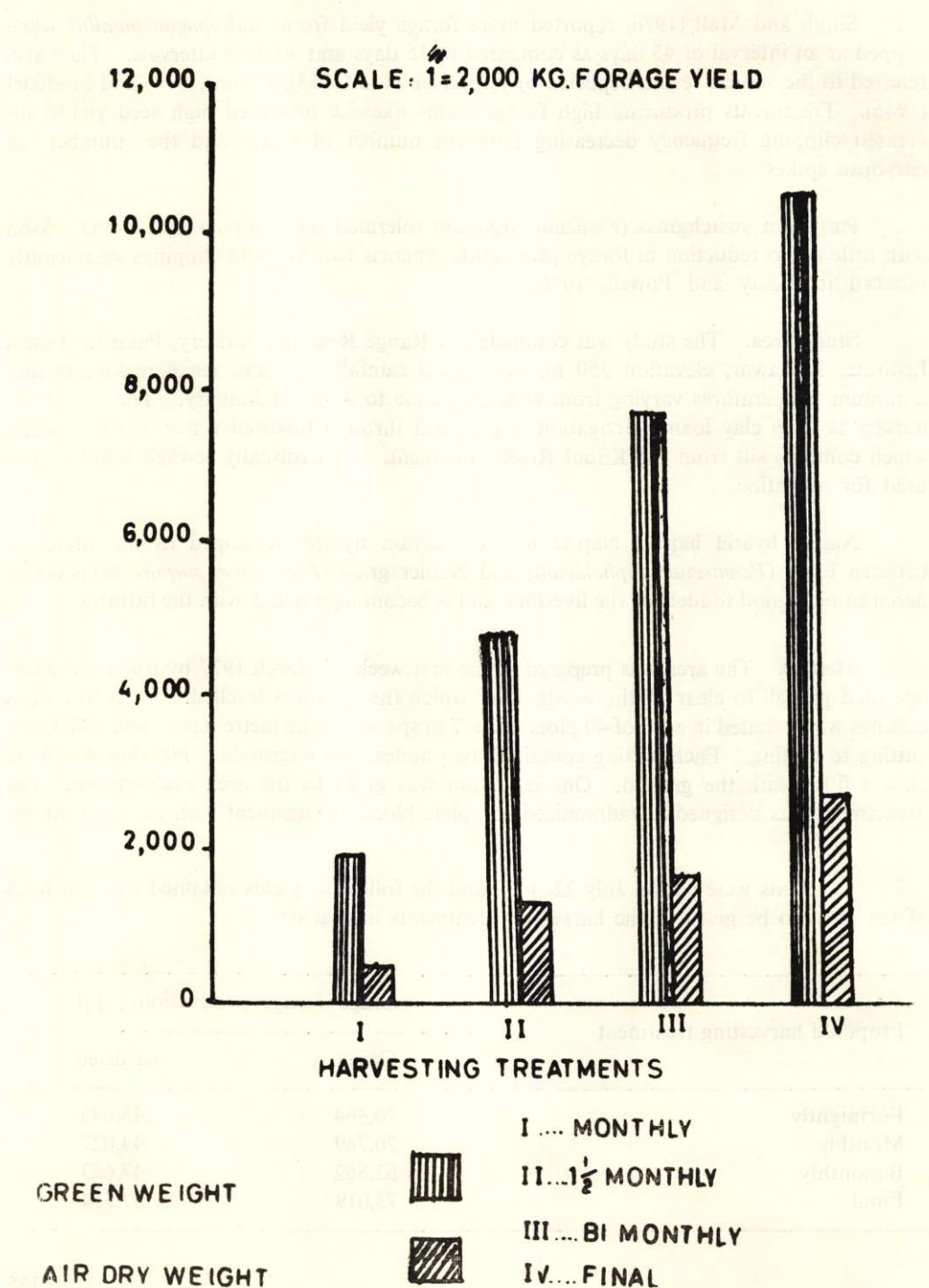
Napier hybrid bajra. Napier hybrid bajra-a hybrid developed as an intercross between bajra (*Pennisetum typhoideum*) and Napier grass (*Pennisetum purpureum*) is considered to be a good fodder for the livestock and is becoming popular with the farmers.

Method. The area was prepared in the first week of March 1977 by using a tractor-operated plough to clear all the weeds, after which the area was levelled. 18 hybrid bajra cuttings were planted in each of 40 plots of 3 × 7 m spaced at one metre line to line and 40 cm cutting to cutting. Each cutting contained two nodes, one internode. Planting was done almost flush with the ground. One irrigation was given to the area each month. The experiment was designed in randomized complete block arrangement with ten replications.

All plants were cut on July 22, 1977 and the following yields obtained from each set of ten plots to be given to the harvesting treatments indicated:

Proposed harvesting treatment	Average forage production (kg/ha)	
	Green	Air dried
Fortnightly	70,564	45,696
Monthly	70,769	44,027
Bimonthly	62,862	47,653
Final	73,019	53,554

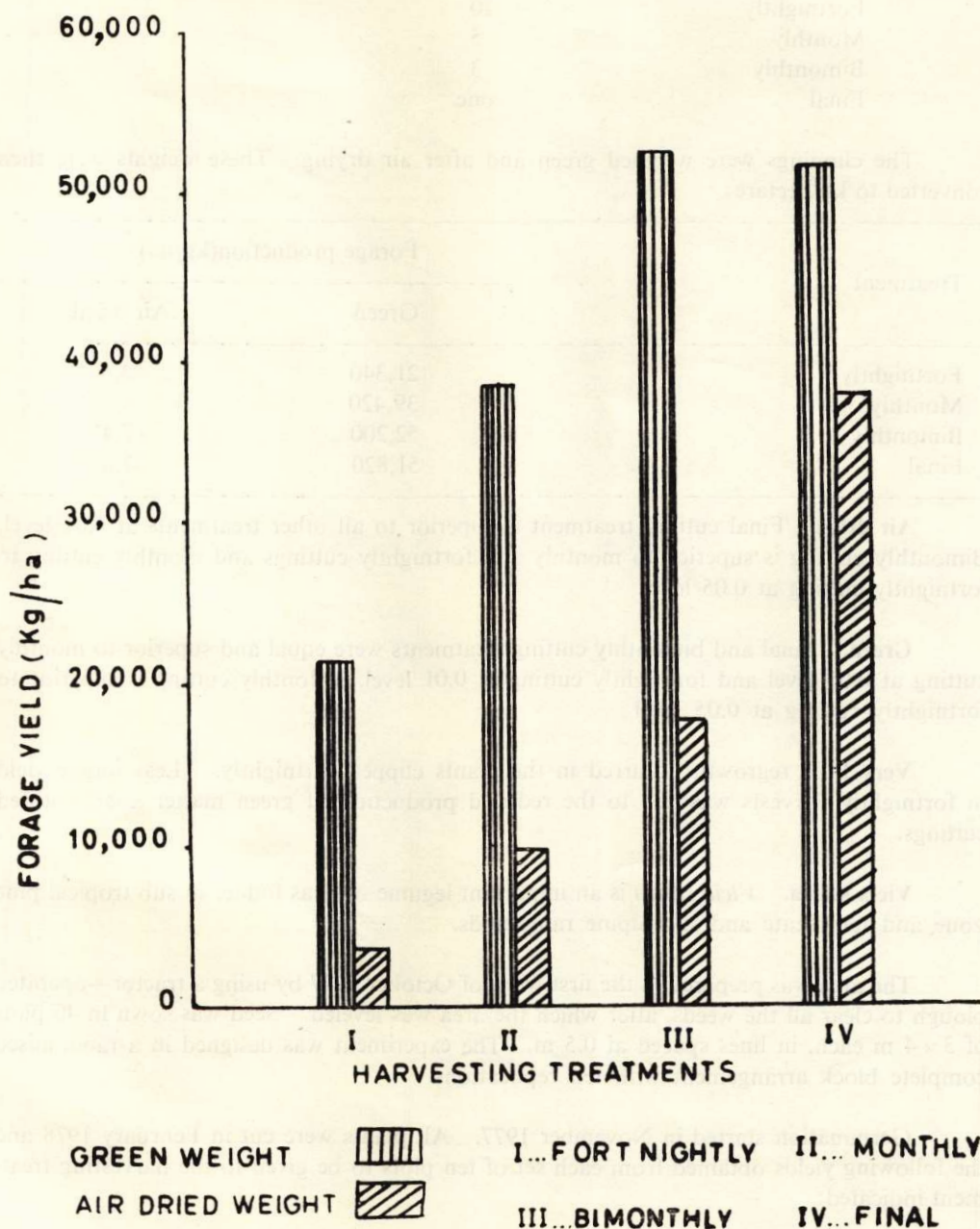
EFFECT OF HARVESTING FREQUENCY ON FORAGE YIELD OF VICIA SATIVA



EFFECT OF HARVESTING FREQUENCY ON FORAGE

YIELD OF NAPIER HYBRID BAJRA

SCALE: 1 = 10,000 Kg. FORAGE YIELD



The first clipping was taken on August 5, 1977 from the fortnightly treatment. For all the treatments, a uniform stubble height of 8 cm was maintained. Clippings were continued according to the treatments upto December 20, 1977 when the plants under fortnightly clipping treatment stopped resprouting. The following number of clippings were taken in each treatment:

Fortnightly	10
Monthly	5
Bimonthly	3
Final	one

The clippings were weighed green and after air drying. These weights were then converted to kg/hectare:

Treatment	Forage production(kg/ha)	
	Green	Air dried
Fortnightly	21,340	3,363
Monthly	39,420	9,776
Bimonthly	52,200	17,476
Final	51,820	37,662

Air dried. Final cutting treatment is superior to all other treatments at 0.01 level. Bimonthly cutting is superior to monthly and fortnightly cuttings and monthly cutting to fortnightly cutting at 0.05 level.

Green. Final and bimonthly cutting treatments were equal and superior to monthly cutting at 0.05 level and fortnightly cutting at 0.01 level. Monthly cutting is superior to fortnightly cutting at 0.05 level.

Very little regrowth occurred in the plants clipped fortnightly. Less forage yield in fortnightly harvests was due to the reduced production of green matter after repeated cuttings.

Vicia sativa. *Vicia sativa* is an important legume used as fodder in sub tropical pine zone and temperate and sub alpine rangelands.

The area was prepared in the first week of October 1977 by using a tractor—operated plough to clear all the weeds, after which the area was leveled. Seed was sown in 40 plots of 3 × 4 m each, in lines spaced at 0.5 m. The experiment was designed in a randomised complete block arrangement with ten replications.

Germination started in November 1977. All plants were cut in February 1978 and the following yields obtained from each set of ten plots to be given to the harvesting treatment indicated:

Proposed harvesting treatment	Average forage production (kg/ha)	
	Green	Air dried
Monthly	6,263	1,594
1-1/2 monthly	5,840	1,508
Bimonthly	4,988	1,283
Final	4,913	1,242

The first clipping was done on March 1, 1977 from the monthly treatment. For all the treatments a uniform stubble height of 7 cm was maintained. Clippings were continued according to the treatments upto May 11, 1978 when the plants started drying up. Following number of clippings were taken in each treatment:

Monthly	4
1-1/2 monthly	3
Bimonthly	2
Final	1

The clippings were weighed green and after air drying. These weights were then converted to kg/hectare:

Treatment	Average forage production (kg/ha)	
	Green	Air dried
Monthly	1,982	417
1-1/2 monthly	4,669	1,342
Bimonthly	7,768	1,675
Final	10,538	2,633

Final cutting treatment is superior to all other treatments at 0.01 level. Bimonthly cutting is superior to 1-1/2 monthly and monthly treatments at 0.05 level. 1-1/2 monthly treatment is also better than monthly treatment at 0.05 level.

Harvesting frequency also affected seed production. No seed was produced from plots under monthly and 1-1/2 monthly clipping treatments whereas areas under bimonthly and final clipping treatments yielded 2.8 and 4.1 kg seed respectively.

Conclusion. Repeated harvests after short intervals are detrimental to the growth of Napier hybrid bajra and *Vicia sativa*. However, at least one harvest can be employed in case of Hybrid bajra and *Vicia sativa* before the final harvest. July and November in case of Napier bajra and January and May in case of *Vicia sativa*.

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