Indian Journal of Agronomy **51** (3) : 245–246 (September 2006)

Effect of harvesting intervals on herbage, oil yield and economics of different varieties of Japanese mint *(Mentha arvensis)*

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Received : November 2004

ABSTRACT

A field experiment was conducted at Research Farm of the Indira Gandhi Agricultural University, Raipur, from mid-January to the last week of August during 2001 and 2002, to find out the effect of harvesting intervals on herbage and oil productivity of different varieties of Japanese mint (*Mentha arvensis* L.) under Chhattisgarh condition. 'Himalaya' variety gave significantly higher mean herbage, oil yield and net returns when it was harvested at 120 days after planting and 75 days after first harvest. In case of 'Koshi' variety, the maximum herbage and oil yields and net returns were obtained when it was harvested at 110 days after planting and 75 days after first harvest.

Key words : Japanese mint, Varieties, Harvesting intervals, Herbage and Oil yields

Mentha arvensis L. is coming up as a promising crop under irrigated condition of Chhattisgarh plain. It has strong potential to become substitute for summer paddy, as it is an economically more profitable crop. But there is a need to develop proper management practices to ensure good production of oil. The selection of variety and harvesting intervals are the most important factors which influence significantly productivity of mentha. The harvesting intervals are most critical, as they directly affect the growth, herbage and oil yield of different short-and medium-duration varieties of Japanese mint. It is necessary to develop optimum harvesting intervals for different varieties of Japanese mint. Hence present investigation was carried out.

MATERIALS AND METHODS

The field experiment was conducted at Research farm of the Indira Gandhi Agricultural University, Raipur, from mid-January to the last week of August during 2001 and 2002, with 'Himalaya' and 'Koshi' varieties. The soil of the experimental fields was Vertisols texturally known as clay loam. The pH of soil was 7.2, available N with 198 kg/ha, available P with 19.0 kg/ha and available K with 356 kg/ha. The treatments comprised 2 varieties ('Himalaya' and 'Koshi') and 4 dates of harvesting, i.e. $H_{110, 75}$, $H_{120, 75}$, $H_{130, 75}$ and $H_{140,75}$ days after planting and days after first harvest. The experiment was laid out under randomized block design following a factorial arrangement with 3 replications. The oil content was extracted by water and steam distillation methods using Clevenger's type essential oil apparatus.

RESULTS AND DISCUSSION

Performance of varieties

Results showed that the significant variation was not observed between herbage and oil yield of 'Himalaya' and 'Koshi' varieties.

Effect of harvesting intervals

The harvesting schedules exhibited a significant influence on herbage and oil yield of both varieties. Higher herbage and oil yield was obtained at first cut when harvested at 120 and 130 days, whereas both early (110 days) and delayed harvest (140 days) reduced the mean herbage yield (Table 1). The delayed harvest (after 130 days) in both varieties drastically reduced the herbage yield, which could be ascribed to loss or shedding of older foliage due to over-maturity of the crop.

The decreased herbage yield had contributed to poor productivity of oil yield and thus resulted in low net returns. Randhawa *et al.* (1995) also reported similar results.

Interaction effect

In 'Himalaya' variety, the early harvesting also affected herbage and oil yield of mentha. The lower herbage and oil yields were resulted because the crop was immature at this stage. Due to immaturity, the foliage development and oil content were not at their peak compared to 120 days. On the other hand, 'Koshi' variety gave the highest herb-

Table 1. Herbage and oil yield of Japanese mint at different harvesting as influenced by varieties and harvesting intervals

Treatment	Herbage yield (q/ha)						Oil yield (kg/ha)					
	2001			2002			2001			2002		
	At 1st harvest	At 2nd harvest	Total	At 1st harvest	At 2nd harvest	Total	At 1st harvest	At 2nd harvest	Total	At 1st harvest	At 2nd harvest	Total
Varieties												
Himalaya	130.12	164.82	294.95	137.26	190.82	381.08	98.63	95.15	193.78	103.81	111.77	215.58
Koshi	121.22	161.03	282.26	131.30	184.50	315.81	95.11	94.37	189.48	101.62	112.97	214.56
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Harvesting intervals												
$H_{110,75}$	134.84	197.59	332.44	143.55	226.25	369.81	106.19	123.49	229.69	112.32	145.49	257.81
$H_{120,75}$	140.92	189.75	330.67	149.44	221.17	370.61	111.96	116.69	228.65	116.75	138.54	255.29
$H_{130,75}$	123.46	142.18	265.65	134.09	168.05	302.14	95.09	76.80	171.89	103.43	93.12	196.48
$H_{140,75}$	103.47	122.19	225.67	110.05	135.17	245.23	74.25	62.06	136.29	78.37	72.33	150.71
CD (P=0.05)	12.84	13.33	20.04	14.48	10.26	17.59	12.26	9.30	18.62	14.27	9.38	18.93
Varieties × Harvesting intervals												
Himalaya $_{110,75}$	122.95	190.25	313.20	127.71	220.76	348.47	92.87	116.07	208.94	95.51	135.62	231.13
Himalaya $_{120,75}$	143.87	187.72	331.59	156.20	219.40	375.60	114.48	114.50	228.98	121.17	132.28	253.45
Himalaya $_{130,75}$	137.88	153.82	291.70	147.75	177.75	325.50	106.31	83.75	190.06	114.28	99.42	213.70
Himalaya $_{140,75}$	115.87	127.51	243.38	120.76	145.39	266.15	83.35	66.31	149.66	84.29	79.74	164.03
Koshi $_{110,75}$	146.74	204.93	351.67	159.39	231.74	391.13	119.51	132.62	252.13	129.13	155.35	284.48
Koshi $_{120,75}$	137.96	191.71	329.67	142.69	222.94	365.63	112.43	120.77	233.20	112.33	144.80	257.13
Koshi $_{130,75}$	109.12	130.54	239.66	120.42	158.36	278.78	83.87	70.82	154.69	92.58	86.82	179.40
Koshi $_{140,75}$	91.08	116.88	207.96	99.34	124.96	224.30	65.15	59.80	124.95	72.45	64.92	137.37
CD (P=0.05	18.16	18.85	13.70	20.51	14.60	21.36	17.34	20.18	18.75	20.18	13.26	21.24

Table 2. Economics of Japanese mint as influenced by harvesting intervls in different varieties

Treatment	Cost of cultivation ('000 Rs/ha)		Gross returns ('000 Rs/ha)		Net returns ('000 Rs/ha)		Benefit : cost ratio	
	2001	2002	2001	2002	2001	2002	2001	2002
'Himalaya' $_{110,75}$	28.17	30.51	62.67	69.33	34.49	38.82	2.22	2.27
'Himalaya' $_{120,75}$	28.82	31.19	69.70	76.03	39.87	44.84	2.42	2.44
'Himalaya' $_{130,75}$	27.61	29.95	57.00	64.11	29.38	34.15	2.06	2.14
'Himalaya' $_{140,75}$	26.35	28.44	44.89	49.20	18.54	20.76	1.70	1.73
'Koshi' $_{110,75}$	29.53	32.14	75.60	85.34	85.06	53.19	2.56	2.66
'Koshi' $_{120,75}$	28.94	31.31	69.60	77.13	40.65	45.82	2.40	2.46
'Koshi' $_{130,75}$	26.53	28.93	43.68	53.82	19.84	24.88	1.65	1.86
'Koshi' $_{140,75}$	25.61	27.63	37.48	41.21	11.87	13.57	1.46	1.49

age and oil yield when harvested at 110 and 120 days intervals. The higher yield was ascribed to full blooming of this variety that took 110–115 days. At this stage, the higher foliage biomass and oil content increased the herbage and oil yield. Similarly, the early first harvesting resulted in higher yield at second harvest. This could be due to the fact that crop get enough time for establishment and proliferation of vegetative growth.

In 'Himalaya' the net returns were higher when it was harvested at $H_{120,75}$ intervals and delayed harvest ($H_{140,75}$) lowered the net returns (Table 2). Net returns were increased by 46% during both years in $H_{120,75}$ over $H_{140,75}$ harvest intervals.

In 'Koshi' variety, net returns were higher when it was harvested at $H_{110,75}$ intervals. Delayed harvesting (after 110 days) gradually decreased the net returns.

REFERENCE

Randhawa, G.S., Satinder, K., Kaur, S. and Craker, L.E. 1995. Optimization of harvesting time and row spacing for the quality oil in Japanese mint (*Mentha arvensis* L.) varieties. *Acta Horticulture* **426** : 615–622.