USING HARVEST SCHEDULES TO ADJUST QUALITY OF SUMMER-GROWN ALFALFA IN THE CENTRAL SAN JOAQUIN VALLEY

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Alfalfa hay growers in the central San Joaquin Valley can vary cutting schedules during the summer months of one season to maintain high yields and acceptable TDN levels for most market uses

To stay in business, alfalfa growers in the San Joaquin Valley need to produce good quality hay that is acceptable to the dairy industry, yet maintain high yields. During April and May this is not a problem; hay quality is good and prices are usually highest. Alfalfa hay yields are best and quality the lowest during June, July and August; resulting in large supplies of hay with low market demand. Normally, the market price difference is not great between high and low TDN (total digestible nutrient) hays in the central San Joaquin Valley. Since hay growers are paid by tonnage, this encourages growers to harvest for higher yields.

During 1979 and 1980 a study was conducted using two-year-old plantings of nondormant alfalfa varieties near Fresno and Livingston. The purpose of this investigation was to determine if alfalfa growers in the central San Joaquin Valley can improve both hay quality and yield by adjusting harvest schedules of nondormant varieties during the period from May through September.

Data were collected from May through September each year. Six forage sample areas in each plot were selected for their best regrowth appearance, and different areas were harvested after 22, 26, 30, and 34 days of regrowth. The entire experimental area was cut on the 34th day to begin the next harvest sequence. The 34-day harvests were made on May 13, June 17, July 22, August 26 and September 30. Air temperatures were continuously recorded at each field for the duration of the study. Hay yields, hay quality (TDN), crown bud regrowth length, and flowering stage were determined at each harvest.

Yield vs Quality

Results of these studies show a negative relationship between yield and quality during the summer months; as yields increased, quality decreased (Graph No. 1). This relationship is even more evident when comparing data from equal harvest intervals during the five month period (Graph No. 2).

Harvest Schedule Effects

When harvested on 22, 26, 30 and 34 day regrowth schedules, alfalfa yields at both locations were greater with longer growing periods. Average TDN levels for the four harvest frequencies declined steadily from 22 days to 34 days. The 30-day cutting schedule produced high yields and acceptable quality during May and September. June, July and August yields were greatest with 34-day cuttings, but highest TDN values were obtained at 22 days during June, July and August. Based on these results, alfalfa hay growers in the central San Joaquin Valley can vary the cutting schedule during the summer months of a single season to maintain high seasonal yields and TDN levels acceptable for most market uses.

Table 1 lists the two-season average quality and yield results from the constant interval harvest schedules and two varied interval harvest schedules. The results of this study indicate that by varying the cutting schedules during June or July of one season, it should be possible to keep TDN levels higher without appreciably affecting seasonal yields. The authors' observations of commercial hay harvest practices in this area since 1967 indicate

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that cutting alfalfa too frequently for a full season will result in a shorter stand life. This is presumed to be due to depleted alfalfa root reserves and competition from weeds.

Some alfalfa growers in the central San Joaquin Valley harvest alfalfa when the field shows 1/10 bloom. In this study during May, the plants were still in the flower bud stage after a 34-day regrowth period. The 1/10 bloom stage occurred with the 30-day cutting schedule in June and August, at 26 days in July, and at 34 days in September. Regrowth of crown buds varied widely in the two locations during the two-year study. Crown bud length responded to temperatures and to cutting frequency, with longer shoot growth resulting during the warmer months for each regrowth period.

Accumulated degree-days of air temperatures above 40°F did not correlate well with either alfalfa forage yields or hay quality (TDN) during the two-year period of this study. Table 3 lists data for the 30-day harvest schedule in both locations during 1980. This data is typical of the results obtained during 1979 and for the other harvest schedules in this study. From these results it appears that accumulated degree-day information is not particularly useful for scheduling harvests of alfalfa hay in this area.

Application Potential

Hay growers and buyers in the central San Joaquin Valley can benefit from applying the results of this study to meet their needs and market demands. Growers can produce summer hay with acceptable feeding quality by harvesting on either a 22-day or 26-day regrowth schedule during June or July. Based upon previous field experience we know that if a three-week harvest schedule is followed for a full season, the alfalfa plant root reserves will be depleted and subsequent production will be reduced severely. Alfalfa hay with acceptable quality can be produced in the central San Joaquin Valley with a 34-day regrowth period between cuttings during the cool spring and fall months.

Acknowledgments

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Table 1. Alfalfa Hay Yield, Quality and Physiological Results from Different Harvest Schedules[1]

Days between cuttings	5 cuttings tons/acre	TDN %	Crown bud regrowth
22	7.11	51.5	.5
26	8.16	50.9	1.2
30	9.17	50.4	1.6
34	9.62	49.5	2.7
30-22-22-22-30	7.76	51.4	
30-26-26-26-30	8.58	50.8	

[1]Averages for 5 cuttings at both locations for two years. (A full season includes 7 to 8 cuttings.)

Table 2. Yield (T/A) and Quality (% TDN) for Various Harvest Schedules (Average of Both Locations for Two Years)

Days between cuttings	May		June		July		August		September	
	Yield	TDN	Yield	TDN	Yield	TDN	Yield	TDN	Yield	TDN
22	1.39	52.7	1.49	51.2	1.51	50.3	1.52	50.9	1.20	52.2
26	1.56	52.4	1.76	50.4	1.84	49.4	1.74	49.9	1.26	52.4
30	1.92	52.2	2.13	50.0	2.01	47.7	1.79	49.8	1.32	52.2
34	1.79	51.5	2.07	48.1	2.31	47.1	2.05	49.5	1.40	51.4

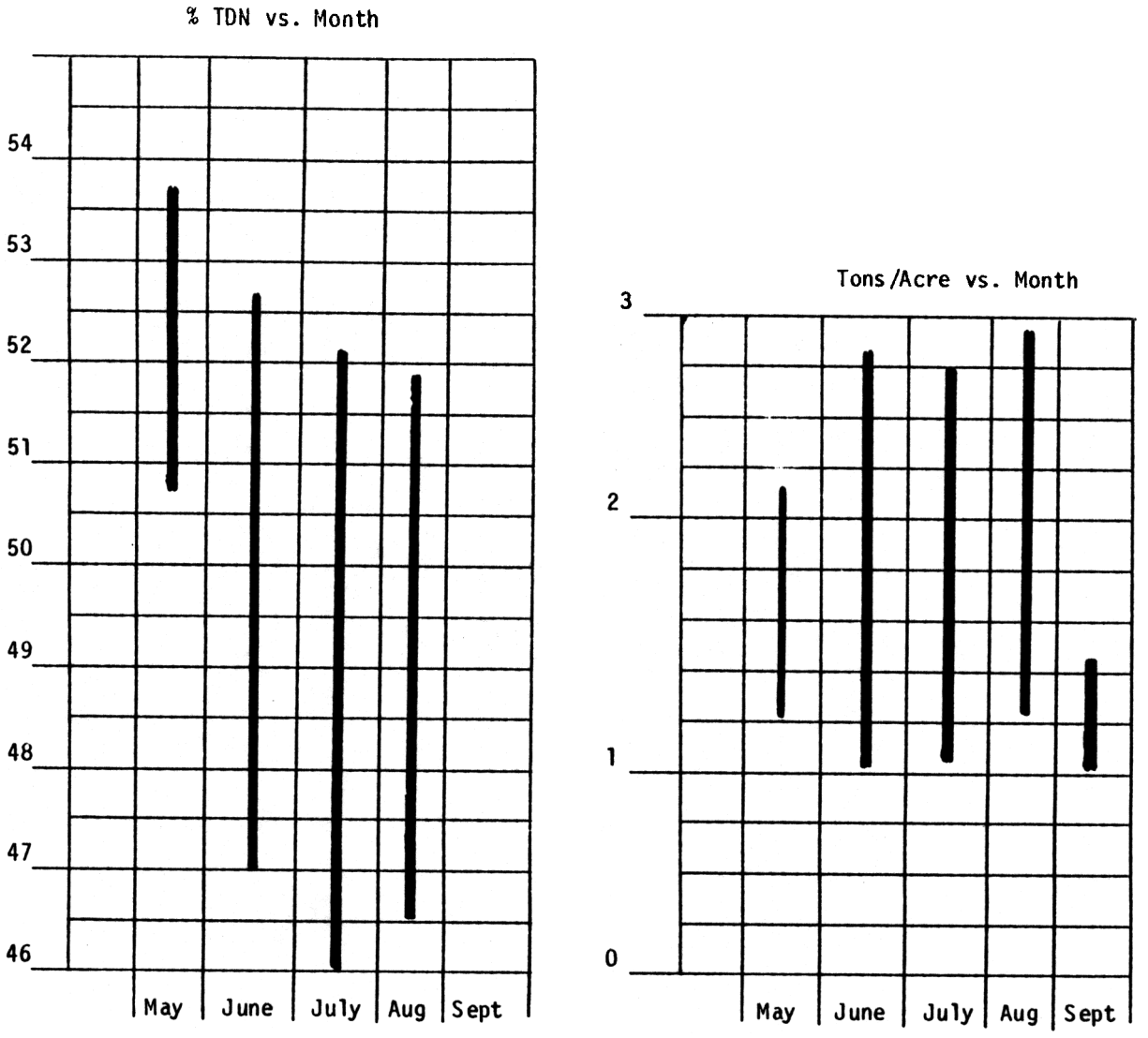
Table 3. Relationships of Alfalfa Yield and Quality to Heat Units Accumulated Between Harvests[1]

	Fresno					Livingston				
	May	June	July	August	September	May	June	July	August	September
Degree-days 40°F	765	860	1152	1350	1027	599	616	886	1044	789
Tons/acre	2.16	2.82	2.14	1.64	1.37	1.67	2.22	1.87	2.23	1.33
% TDN	53.6	48.1	47.3	50.0	51.3	50.8	50.4	47.3	48.7	53.0

[1]30-day harvest schedule, 1980 season data.

Graph No. 1

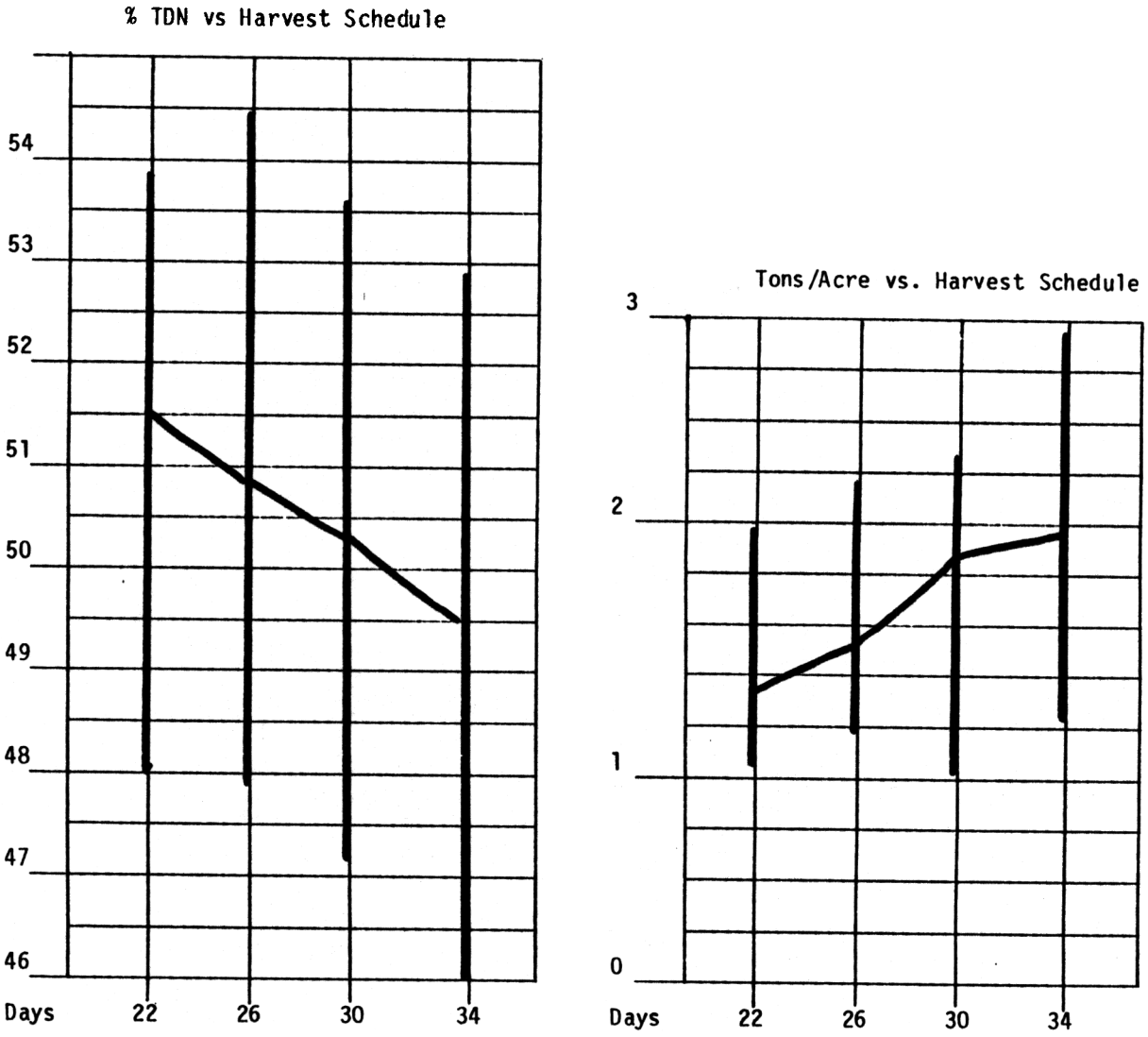
ALFALFA HAY QUALITY AND YIELD VS. HARVEST MONTH[1]



[1]Line graph illustrates average of two years at both locations; bar graph illustrate ranges of all results at both locations.

Graph No. 2

ALFALFA HAY QUALITY AND YIELD VS. DAYS OF REGROWTH[1]



[1]Line graph illustrates average of two years at both locations; bar graphs illustrate range of all results at both locations.