1983 ALFALFA SURVEY

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A survey of Massachusetts alfalfa fields was conducted May through August 1983, examining yield, stand composition, forage quality, fertility, diseases and insects. The state-wide survey of alfalfa was part of the Forage Integrated Pest Management (IPM) Project here at the University of Massachusetts. More than fifty fields (23 farms) were surveyed, from Sheffield and Pittsfield in the west, to Merrimac and Bridgewater in the east. At least one, but usually two, cuttings (five locations per field) were sampled for yield estimation. Potassium, phosphorus and boron levels were determined by the Department of Veterinary and Animal Science for all the fields surveyed for yield. The presence or absence of disease was determined by the Department of Plant Pathology. Since sampling methods for insect levels were quite different and more intensive, sampling for insect damage was done on a limited number of fields by the Department of Entomology. Although this is a standards sampling technique, the area sampled was small, and the variability was often quite high. Our yield estimate will also differ from actual yields according to how close to actual harvests the samples were taken and that in our sampling there were no losses due to raking and bailing.

Evidence of wheel-track damage in most fields was found at the second cut. Compaction during wet weather can be a serious problem for alfalfa, inhibiting gaseous exchange to the root, slowing growth and often killing the plant.

Weeds:

The 1983 weed survey revealed the existence of 17 weed species in alfalfa fields (23 farms with approximately 36 fields). Perennial weeds accounted for 58.8% of the species found in the sample areas. This represents both grass and broadleaf weeds. Annual weeds represented 35.3% and biennial species were 5.9% of the total species observed. Sixty percent of the perennial weeds were broadleaf weeds. Most of the weeds were found at first cutting, while 41% of the weeds were still present at second cutting.

Dominant perennial broadleaf weeds were common dandelion, broadleaf plantain, curley dock, wild carrot and buckhorn plantain. The predominant perennial grassy weed was identified as quackgrass. Other forage species such as orchardgrass, timothy, and Kentucky bluegrass were common to many stands. Other grassy weed species were observed in the survey area (such as barnyardgrass and grabgrass) and hopefully these will be characterized further in the coming year.

The presence of weeds in most Massachusetts alfalfa stands underscores the need for weed control in alfalfa. Perennial weeds are often a problem in alfalfa because they become established with the crop and persist in spite of proper management practices and competition from the legume in the mixed stand.

Protein and ADF:

The first cut averaged 19.9% and the second cut 20.2% crude protein (Table 1). These values were much closer than expected, probably due to complete retention of the leaves in both cases. Protein levels were largely responsive to the percentage alfalfa in the stand, except where the broadleaf portion

Table 1. Yield, curde protein and ADF content of 1st and 2nd cut alfalfa from 19 Massachusetts dairy farms.

Sample	Yield	C.P.	ADF
	t/a hay	%	%
First cut (36 samples)	2.30	19.90	33.04
Range	1.17-3.70	24.41-25.84	26.01-40.56
Second cut (31 samples)	1.74	20.20	34.24
Range	0.93-2.65	16.23-23.54	27.14-39.98

Crude Protein Yield Range, 2 cuts (t/a protein): 0.436-1.049

Note: The crude protein yield ragne for 15-30 t/a 70% moisture corn silage would be approximately 0.36-0.72 t/a protein (dry basis).

consisted of a legume (the highest CP level was recorded in an 80% Arlington Red Clover/20% alfalfa stand). Percent protein for hay mixtures ranged from 20-24% CP for stands of over approximately 70% alfalfa, and from 15-20% CP for mixtures below 70% alfalfa.

Acid detergent fiber (ADF) values were slightly higher for the second cut versus first cut (Table 1). There was no obvious relationship between ADF values and percent alfalfa in the stand, or to the weed and grass content. The range in ADF values was large (26.0-40.6%) and suggests a wide range in energy value. Some samples were high in both protein and fiber. These results emphasize the importance of testing for composition prior to feeding.

Soil and Tissue Samples:

Soil samples were taken early in the season (before first harvest) and therefore will not reflect any subsequent fertilizer applications. Soil phosphorus (P) levels were adequate to very high on almost all of the fields sampled. Potassium (K) levels in soils were only adequate in about half the fields sampled however, indicating that some farmers may be neglecting this important nutrient. While all of the tissue samples contained adquate or high P levels (reflecting the high soil P status), many of the tissue samples contained low levels of K, corresponding approximately to low soil K. Potassium deficiency symptoms were also observed on some of the fields with very low K soil and tissue status (observed K deficiency symptoms were white chlorotic spots distributed on the tips of leaves). Potassium deficiency may begin long before the symptoms appear, and may cause reduced growth, poor resistance to drought, and increased susceptibility to winter injury and disease damage.

The study suggests a relationship between K status and grassy weed infestation. All of the fields with deficient or low soil or tissue K levels had over 40% grass in the mixture. Seventy-eight percent of the fields with low or deficient tissue K and 75% of the fields with low or deficient soil K had moderate to severe quackgrass infestation. There were many other variables from site to site in this study, so a definite relationship between K status and weedy grass infestation cannot be stated.

At least 1/3 of the first cut alfalfa tissue samples contained deficient amounts of boron. Boron (B) is probably the only micronutrient likely to be in short supply for alfalfa in many Massachusetts soils, especially in sandy and medium textured soils. During dry periods, and with a low soil B supply, the amount of water soluble B may not be adequate for plant growth. Therefore boron deficiency is more apt to show up in second and third harvests. The importance of an application of B during the growing season cannot be overemphasized.

Disease:

One major crown and root disease and two major stem and foliar diseases were prevalent in the State during the 1983 growing season. Fusarium crown and root rot was present in most fields in the State. In the spring, wet weather caused an outbreak of spring black stem, while the dry summer weather caused anthracnose problems in most locations. There were no varieties resistant to the first two diseases, but anthracnose resistance is available in a few varieties such as Saranac AR. Dr Manning's group in Plant Pathology are presently looking into how much damage may be caused by fusarium rot and examining ways to reduce this damage.

Insect:

There are three insects that cause concern to alfalfa growers in Massachusetts: alfalfa weevil, alfalfa blotch leafminer and potato leafhopper. In 1983, leafminer populations started emerging from the soil late in the spring, compared to the early growth of alfalfa. Therefore, the first brood of adults laid most of their eggs into alfalfa just before first cutting. This harvest removed most of the fly eggs and larvae with the result that leafminers never reached the high numbers that have been more common late in the past few seasons.

Alfalfa weevil has not reached economic numbers in Massachusetts for several years. The low populations have been attributed to the action of parasites that were introduced in the 1960's and early 1970's. However, in New York and other northeastern states, alfalfa weevil has remained fairly abundant in spite of the actions of parasites. This year we began detecting higher numbers of weevils in our alfalfa pest surveys. If the trend continues in 1984 we shall probably have some fields that will require chemical treatment.

Potato leafhoppers migrate from the South each growing season, carried by southerly winds. Its appearance is sporadic and we cannot predict when the 'hoppers' will arrive or how many there will be with our current technology. A regional project is being organized in the southern states that should facilitate our ability to forecast arrival of this pest, but not in 1984. In 1983 leafhopper was first detected in Massachusetts alfalfa on July 7. It did not become significant in most of the alfalfa surveyed.

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