

USING ALFALFA-GRASS MIXTURES TO MINIMIZE DEER DAMAGE

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Alfalfa is a prime feed source for both dairy cows and on-domesticated, white-tailed deer in Pennsylvania. Damage to alfalfa can be great. Numerous attempts have been made to deter deer from feeding on alfalfa and other crops but they have generally proven unsatisfactory because of high costs and/or ineffectiveness. Several researchers have reported that deer prefer alfalfa to forage grasses. However, the use of alfalfa-grass mixtures to deter deer from feeding on forage has been untested.

Study Description

Plots of alfalfa, timothy, orchardgrass, and alfalfa-timothy or orchardgrass mixtures in 3:1, 2:2, and 1:3 alfalfa to grass row arrangements were established within areas protected (with fencing) or unprotected from deer feeding. Forage from these plots was harvested three and four times in 1995 and 1996, respectively, and dry matter yield, percentage alfalfa and grass, and forage quality were

determined. Economic evaluation of each treatment was made based on the value of the harvested forage and the differential costs associated with production.

Applied Questions

• **To what extent do deer damage forages in central Pennsylvania?** Forages protected from deer feeding averaged 1660 lb./acre more DM yield than their unprotected counterparts (Table 1). The greatest amount of deer feeding occurred in pure alfalfa and the least in pure orchardgrass. Forage quality was not affected by deer grazing. Weeds began to invade the plots in the second year of the study and were more severe in the unprotected than protected plots. Deer feeding resulted in average economic loss of \$80 and \$28/acre for pure alfalfa and pure orchardgrass, respectively.

• **Do deer selectively graze one forage species over another?** Deer selectively grazed alfalfa out of the alfalfa-grass mixtures and fed more on plots which contained timothy than those which contained orchardgrass. Averaged across all mixtures, alfalfa made up 35% of the total yield in the protected but

only 19% in the unprotected mixed plots. Average yield reductions, as a result of deer feeding, were 1507 and 1102 lb./acre (excluding weed yield in 1996) for treatments containing timothy and orchardgrass, respectively (Table 1). Consequently, the economic losses associated with deer feeding were greater for mixtures containing more timothy than orchardgrass (Table 2).

• **In a field where deer generally feed, are particular forage species mixtures better than others?** In areas unprotected from deer feeding, pure orchardgrass and alfalfa-orchardgrass mixtures had greater total yields than pure alfalfa (Table 2). Weed infestation in second year of the study was greatest in pure alfalfa which had the greatest deer feeding and least in pure orchardgrass which had the least deer feeding in the first year of the

study. Forage quality was not affected by deer feeding within the unprotected plots but was affected by the proportion of alfalfa to grass in the mixture. Alfalfa-orchardgrass mixtures had greater economic returns than pure alfalfa but only when alfalfa was seeded at $\geq 50\%$ of the mixture (Table 2).

Recommendations

Deer feeding can greatly reduce forage yield. Deer selectively grazed alfalfa out of alfalfa-grass mixtures and showed a preference for timothy over orchardgrass. The use of orchardgrass alone or in a mixture with alfalfa reduces deer feeding and provides the greatest yields. However, when deer feeding occurred, net economic returns were greater for alfalfa-orchardgrass mixtures because of improved quality compared to pure orchardgrass.

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Table 1. Decrease in dry matter yield associated with deer feeding compared to no deer feeding on pure alfalfa, pure grass, or alfalfa-grass mixtures seeded in different row arrangements (mean of two locations for two years).

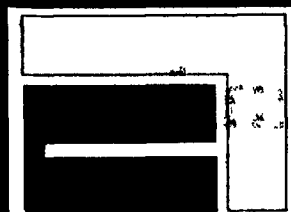
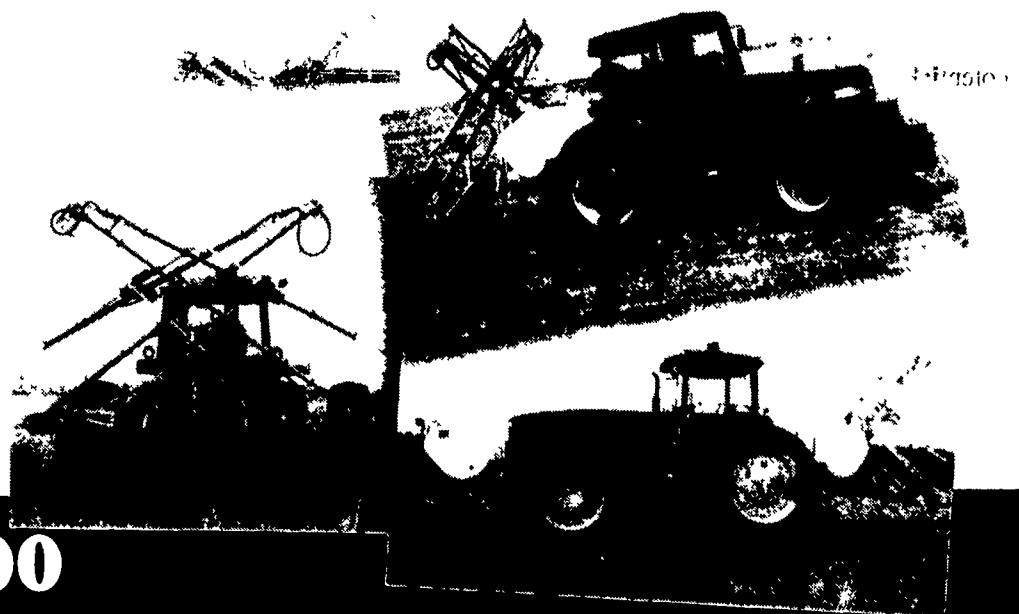
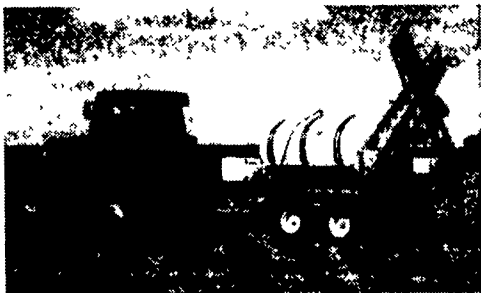
Grass species	Rows alfalfa: rows grass	Reduced yield		
		alfalfa	grass	total†
		lb/acre		
---	4:0	2392	0	2392
Timothy	3:1	2229	154	2384
Timothy	2:2	1272	926	2198
Timothy	1:3	900	822	1722
Timothy	0:4	0	1230	1230
Orchardgrass	3:1	1732	134	1866
Orchardgrass	2:2	1050	568	1617
Orchardgrass	1:3	698	394	1092
Orchardgrass	0:4	0	435	435

†Reduction in alfalfa and grass yield combined. Weed yield is not included in total.

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