

Influence of Fall Defoliation Height on Productivity of Three Perennial Grasses

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By Leslie Roche, Pasture and Range Specialist, UC Davis and
David Lile, County Director and Livestock and Natural Resources Advisor, Lassen County

Introduction: Irrigated pasture and grass hay are important crops in the Intermountain area of northern California. The forage produced on these fields is either grazed by cattle or harvested as high-quality hay, a cash crop sold primarily to feed stores outside the local area. Currently, little attention is paid to the defoliation height of perennial grass fields. Growers seek to utilize as much of the available fall forage as possible to capture as much yield as possible or to delay the onset of winter feeding. This grazable fall forage provides a valuable resource as winter feed. In winter, cattle are often put out on these same irrigated pastures or hay fields, reducing stubble height even further. Other growers, lacking a livestock enterprise, may burn their fields in winter, thus fully removing any remaining stubble. What is the effect of these different management practices and is fall stubble height important for perennial grass production?

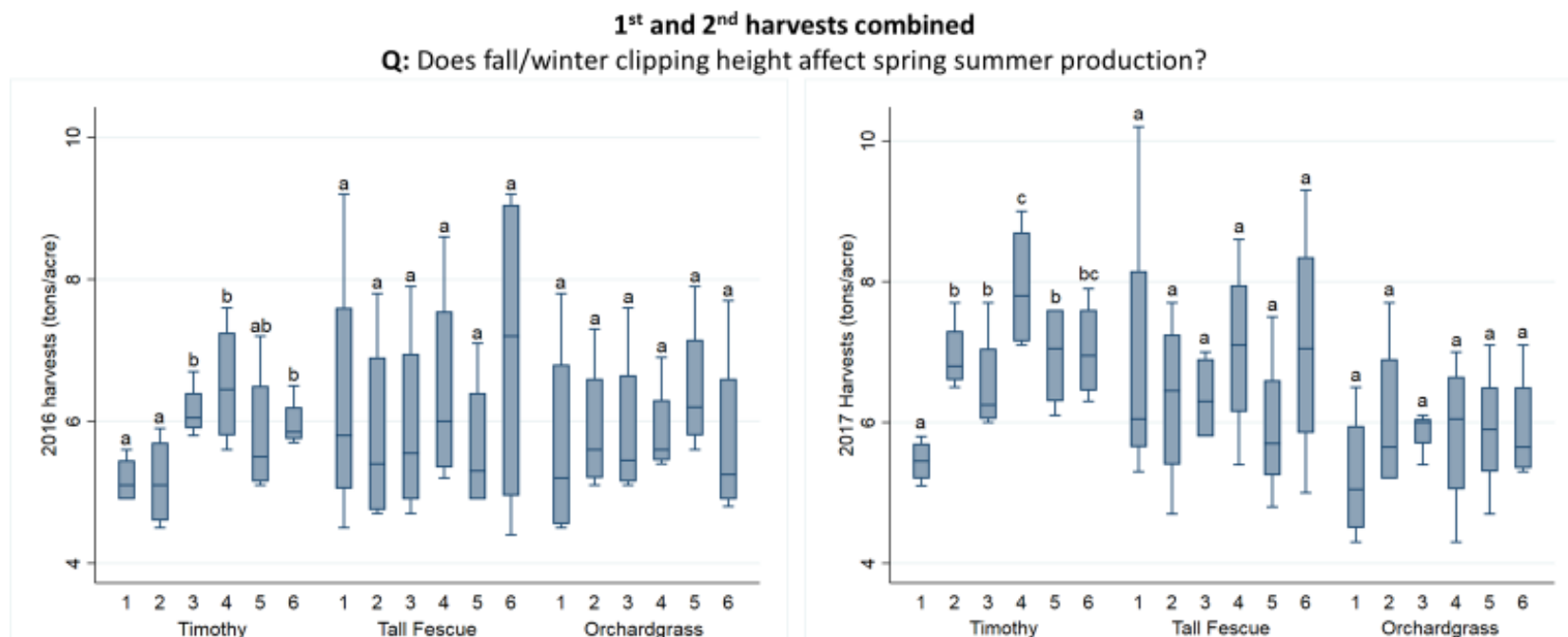
Residual stubble may provide microclimate effects that protect buds during cold winter temperatures. Reducing stubble height during the fall/winter period could also negatively impact meristematic tissues of any non-dormant plants, potentially curtailing tiller growth in the spring. Hence, fall stubble height could significantly affect pasture productivity in the subsequent growing season. In this project we are evaluating the effect of residual fall stubble height in addition to severe defoliation or burning over the winter months on the subsequent productivity of three common perennial grass species (tall fescue, orchardgrass and Timothy).

The perennial grass species tall fescue (Tuscany II), orchardgrass (Century) and Timothy (Aurora) were planted in blocks (main plots). Six different fall/winter management practices are imposed on each of the species.

1. Fall harvest height as close to soil surface as possible (approximately 0.5 inch)
2. 2-inch fall harvest height
3. 4-inch fall harvest height
4. 6-inch fall harvest height
5. 4-inch fall harvest height followed by a mid-winter clipping close to the soil surface
6. 4-inch fall harvest height followed by a mid-winter burning

Research Update: Figure 1 shows yield for both 1st and 2nd cutting after fall clipping heights were imposed both years. In the case of timothy, increasing fall cutting height to 4 or 6 stimulated significantly higher hay yield the following season. Conversely, tall fescue and Orchardgrass hay yields were similar across cutting treatments, although there were some apparent yield reductions from lower cutting heights. The second figure shows yield of 1st and 2nd cutting combined with the yield of fall forage harvest from cutting treatments. When considering the fall forage component, yields were generally more similar across cutting treatments suggesting some of the yield lost at 1st and 2nd cutting is regained in the fall with the more intensive harvesting. In the case of tall fescue, preliminary analyses found the shortest fall clipping height produced the highest annual yield across cutting treatments. A formal report will be available at study completion.

Figure 1. 1st and 2nd cutting Hay Yield the Year after Fall Defoliation Treatments. Within each perennial grass species, different letters indicate significant ($p < 0.05$) differences between. Individual boxplots depict the 95th, 75th, 50th (median), 25th, and 5th percentiles.



Management Treatments

1	Fall harvest height as close to soil as possible	4	6 inch fall harvest height
2	2 inch fall harvest height	5	4 inch fall harvest height followed by a mid-winter clipping
3	4 inch fall harvest height	6	4 inch fall harvest height followed by a mid-winter burning

Figure 2. Total Annual Yield (1st Cutting, 2nd cutting, and Fall Forage Yield) after Fall Defoliation Treatments. Bars are one SE of mean.

1st and 2nd harvests and treatment harvest combined (total annual yield)

Q: Do any potential gains in spring/summer production from less intensive harvest treatments (e.g., 4 and 6 inch fall harvests) off-set forage left unharvested in fall (i.e., is total annual yield impacted)?

