

Do Different Termination Methods of Glyphosate Resistant Alfalfa Affect the Yield and Quality of the Succeeding Silage Corn Crop?

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Introduction

- Glyphosate containing herbicides have long been the standard method for terminating alfalfa stands in Utah.
- Development of glyphosate resistant alfalfa eliminates glyphosate as a stand removal option.
- Alfalfa stand termination method may affect: alfalfa regrowth, soil characteristics, and N availability.



Figure 1. (a) Declining alfalfa stands in Utah are often terminated and rotated into silage corn. The type and timing of termination can affect the (b) amount of alfalfa regrowth and (c) N availability. Will tillage type and timing and/or herbicide timing affect the subsequent yield and quality of silage corn?

Objective

- The objective of this study was to determine the effect of tillage type and timing, herbicide timing, and N rate on corn emergence, alfalfa regrowth, and yield and quality of silage corn.

Materials and Methods

- **Sites:** Cornish, UT- Layton loamy fine sand; Cache Junction, UT- Trenton silty clay loam.
- **Design:** Treatments were arranged in a randomized complete block split-split plot with four replications.
- **Treatments:**
 - Whole plot (Tillage type and timing): fall conventional till, spring conventional till, fall strip-till, spring strip-till, no-till.
 - Sub-plot (Herbicide timing): fall, spring, in-crop, control.
 - Sub-sub plot (N rate): 0, 56, 112, and 224 kg N ha⁻¹.



Figure 2. Tillage treatments included (a) conventional tillage (b) strip tillage (c) No tillage.

- **Data Collection:** Corn emergence rate, alfalfa regrowth, available N, yield and quality of silage corn. For brevity, only yields are presented in this poster.
- **Statistics:** Data were subject to ANOVA using PROC GLIMMIX in SAS and means were separated using a series of pairwise contrasts ($P \geq 0.05$).



Figure 3. Silage yields were determined by harvesting the two center rows of each plot. A sub-sample was taken from each plot to determine quality.

Results and Discussion

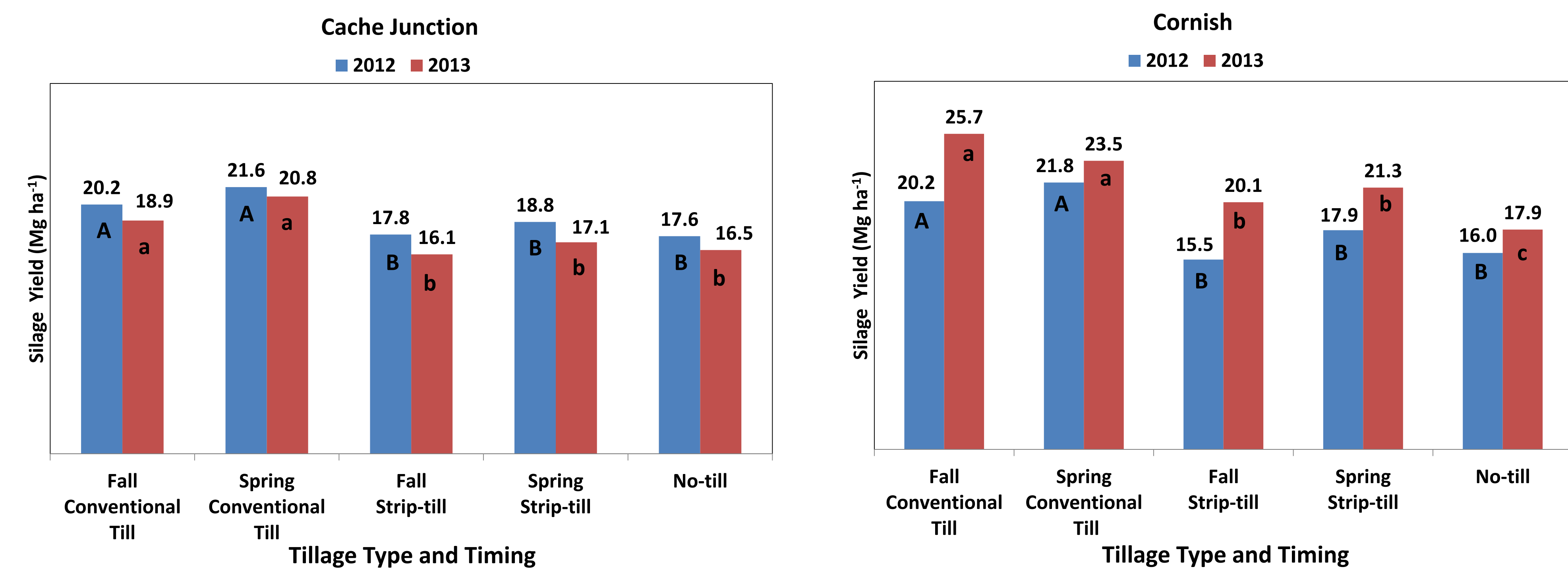


Figure 4. The effect of tillage type and timing on corn silage yield. Means with the same letter are not statistically different ($P \geq 0.05$). Sites and years were analyzed separately. Fall and spring conventional tillage yields were the highest at both sites in both years. Both strip-till timings at each site yielded similarly to no-till except Cornish in 2013 where both strip-till timing yields were higher than no-till.

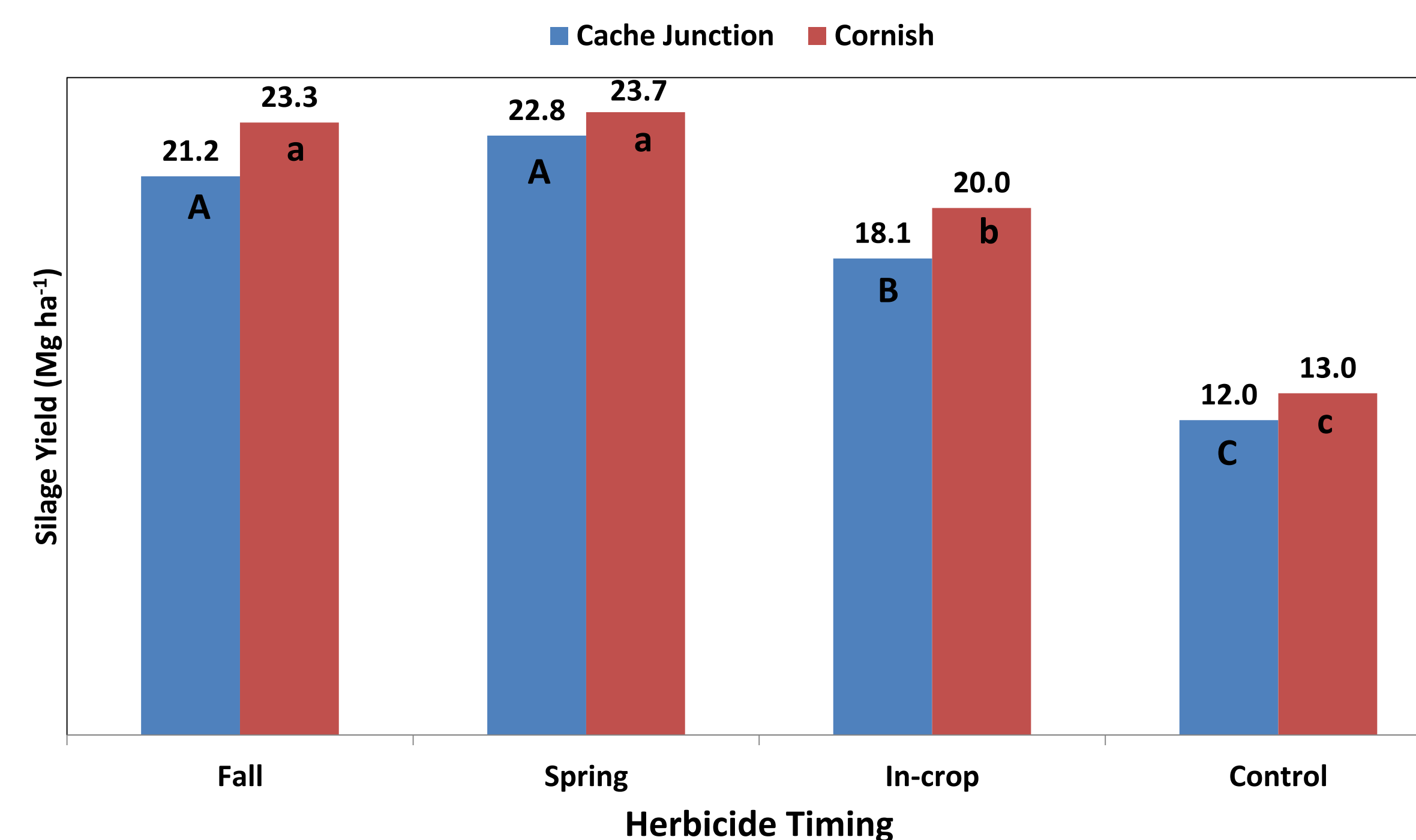


Figure 5. The effect of herbicide timing on silage yield. Years were combined. Fall and spring herbicide timings resulted in the highest yields. The in-crop timing showed a decrease in yield, most likely caused by the alfalfa competing with the corn seedlings in the early spring before the in-crop herbicide treatment was applied. The control treatments yielded the lowest.

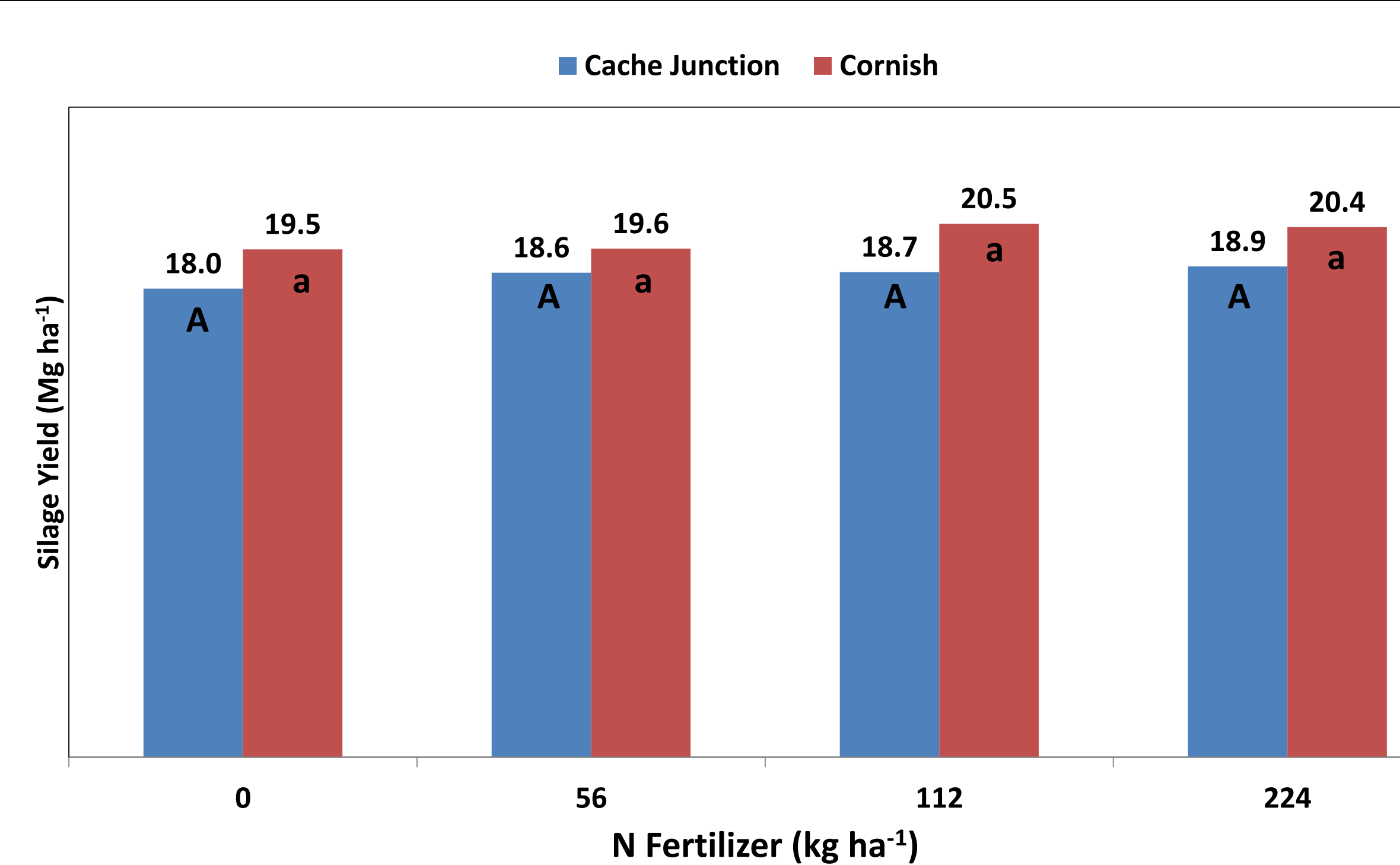


Figure 6. The effect of N fertilizer on silage corn yield. Data were combined over years. There was no statistical difference in yields as the N rate increased at either site in both years. It appears that the terminated alfalfa stand may be able to provide all of the N needs for first-year silage corn.

Conclusions

- Silage corn yields under conventional tillage were higher than strip-till and no-till.
- Fall and spring tillage timings resulted in similar corn silage yields.
- Herbicide applications to terminate alfalfa can be done in the fall or spring before planting to protect corn yields.
- Little to no N fertilizer may be needed in first-year corn after alfalfa.