Use of almond shell byproduct mulches in alfalfa production

Rachael Long, rflong@ucanr.edu and Sarah Light, UCCE Yolo and Sutter-Yuba

Mulches. These are products like bark, woodchips, or straw, that's spread on top of the soil in and around plants to protect enrich soil. With support from the California Alfalfa & Forage Association (CAFA) we've been evaluating the use of almond shell byproducts on alfalfa to manage almond shell waste byproducts along with measuring possible benefits such as soil moisture retention, weed control, and nutrient enrichment.

2021-22 Research Results from almond Shell Applications. Almond shells are high in carbon and low in Nitrogen (C:N ratio), so will immobilize some soil N when put back on croplands. However, this should not be a problem for alfalfa since it's a legume and fixes N. This unique feature of alfalfa means that one can apply high C:N amendments to alfalfa in crop rotations giving farmers more options for managing high carbon ag by-products like almond shells. In addition, since the shells aren't incorporated, any N tied up will be slow and only on the surface. Shells also have some K (potassium), about 29 lbs/ton (35 lb K_20/ton), which can be eventually leached with rain or flood irrigation, enhancing plant nutrition.

In the fall of 2021, we applied almond shells to an alfalfa stand at 4-8 tons/ac (8 tons/acre giving about a ½-in cover) in Yolo Co., CA. One of the challenges of spreading shells is that they're so light that it's hard to assess application rates. By spring, the shells had 'melted' into the ground, and it was hard to tell where applications occurred.

Results. First cut yields and stand counts in 2022 were not significantly different for almond shell mulches versus untreated control plots (Fig. 1). Although weed pressure was light, there appeared to be some benefit of the almond shell mulch on suppressing weeds. There were no significant differences in stand counts in the spring after application.

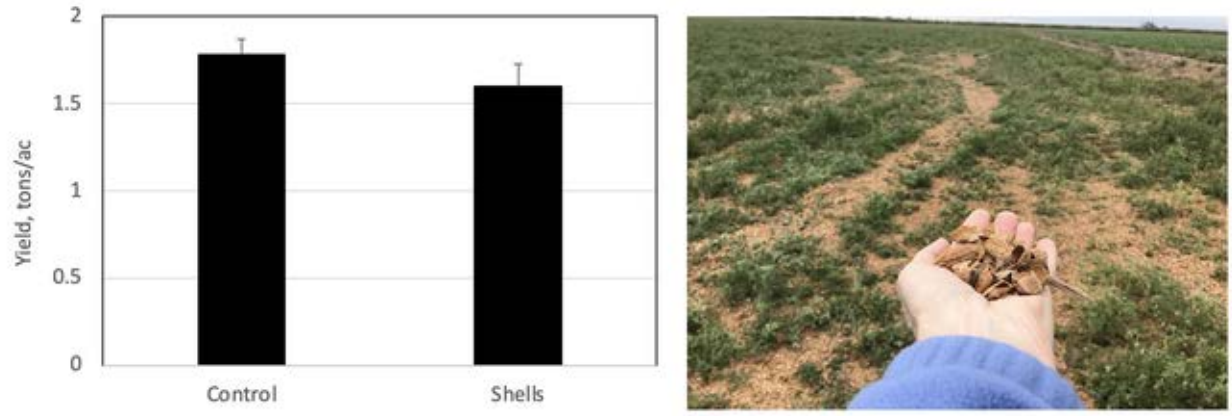

Figure 1. First-cut 2022 response of alfalfa yields to application of almond shells applied in 2021, Yolo Co., CA.

Future work. In the fall of 2022, we'll apply another application of almond shells and measure additional benefits including soil moisture retention, organic matter, and macronutrients in the soil.