Utilizing Irrigation and Plant Growth Regulators to Maximize Seed Yield in Red Clover

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Background: Red clover is the most widely grown legume seed crop in the Willamette Valley. Red clover seed yields have roughly doubled since the mid-1970's and our recent work indicates that trinexapac-ethyl (Palisade®) PGR and irrigation can increase seed yield under Willamette Valley conditions.

OSU Studies: Two plantings (2011 and 2012) of red clover seed crops were established in the fall at Hyslop Research Farm and each have been followed over a two-year period to examine the effects of irrigation and PGRs. All PGR treatments have been allocated within irrigated and non-irrigated environments. PGR treatments have been applied at rates of 0-5 pints/acre at stem elongation (BBCH 32) and bud emergence (BBCH 50). Seed yield and weight, components of yield and seed quality measurements have been taken each year. We are currently in the final (third) year of the project.

Results: In both first and second year stands, a single irrigation increased seed yield by approximately 10% and increased seed weight by 5%. In the first year stands there has been a trend for increased seed yield when TE was applied at stem elongation but the increase has not been significant. In the second year stand, seed yield was increased by 10% at 1 pint/acre at stem elongation while higher rates (2 to 5 pints/acre) increased seed yield by an average of 18% at stem elongation (Table 1). Application of TE at bud emergence either did no change yield or lowered yield. When applied at stem elongation, TE appears to increase seed number, as a result of increasing heads/m^2. Seed weight decreases at both timings but appears to be more sensitive at bud emergence (Figure 2). Seed cleanout was significantly reduced by applications of TE at stem elongation but not at bud emergence. Recent studies conducted in Norway and New Zealand have resulted in similar conclusions.

Figure 1. Effect of TE on seed yield.

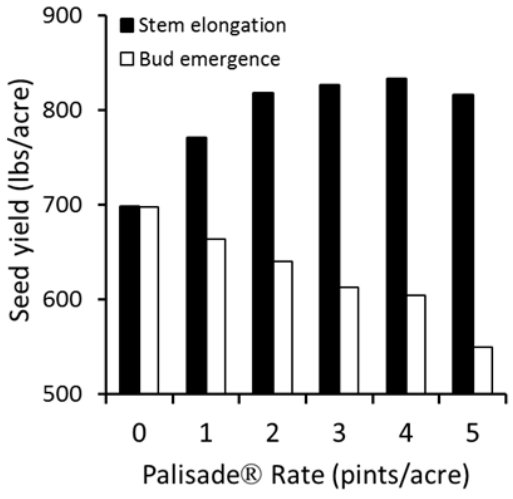
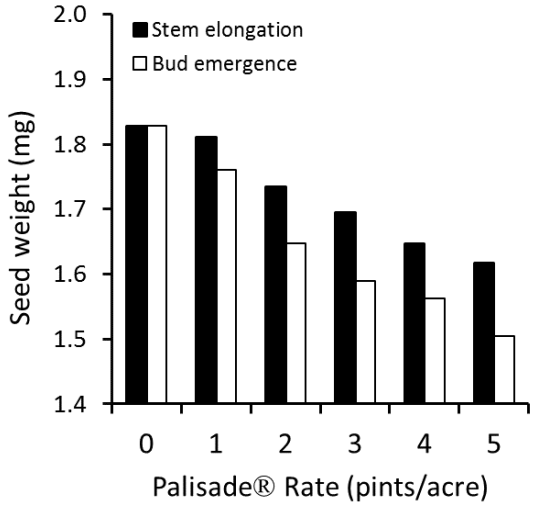


Figure 2. Effect of TE on seed weight.



Understanding Nutrient Management in Clover Seed Crops

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Background: One soil property widely known to be critical in legume seed production is pH. Clovers and other legumes do not tolerate acidic soils (Figure 1). Very limited information exists for clover nutrient requirements. Nitrogen (N), sulfur (S), and boron (B) are commonly deficient in are likely yield limiting nutrients. There is also concern about potassium (K) as a result of increased straw removal in grass seed rotations. Current OSU nutrient management recommendations for clover are lacking and can be improved with field-based applied research.

Figure 1. Crimson clover growth in low pH (left) and high pH (right) environments.

Figure 2. Crimson clover leaf tissue with (lower) and without (upper) S fertilizer.

OSU Studies: Plots were established in the fall of 2014 and will be carried out for two years. Fertilizer treatments were applied in the fall and spring. The trial was cut for silage in early May.

Results: Study results from a preliminary two year trial conducted in 2012-2013 indicate that B does not increase seed yield or change seed quality in red clover at a soil test level of 0.3-0.4 ppm. B fertilizer increased tissue B concentrations when applied in summer; however, no increase in tissue B was measured with fall applications. Seed yield, seed weight, and tissue concentration will be measured for N, S, B and Mo treatments in summer of 2014 and 2015. Results will be reported at future industry meetings and in the OSU Seed Research Report.