



Timed Nitrogen Applications on Pennycress

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Abstract: The purpose of this study was to determine the effect of the timing of nitrogen application on pennycress seed yield and oil content. The goal of this study is to contribute to pennycress commercialization by determining when nitrogen should be applied to optimize desirable plant traits while minimizing nitrogen run-off. The two varieties selected for this study were tt8-t/Arv1, a gene edited golden pennycress line, and Arv2032, a wild type parent pennycress line. There were nine treatments split up between spring applications, fall applications and a control group. The control had zero pounds of nitrogen added. The fall application consisted of fifty pounds of nitrogen incorporated prior to planting. The spring only applications were: fifty pounds of nitrogen applied at dormancy, fifty pounds applied at bolting, fifty pounds applied at first flower, and fifty pounds applied at full flower. Finally, there were four treatments which consisted of a fall and spring application. Each treatment was replicated four times for each variety in a randomized split block design. The results for tt8-t/Arv1 were inconclusive as there was high variability across replicated treatments caused by wild pennycress contamination. However, there was a trend of the treatments that consisted of a fall application with an additional application in the spring increasing seed yield, increasing total, slightly decreasing the oil content by a dry weight basis, and slightly increasing oil yield. Additional research is needed to reach a definitive conclusion on the effects of the timing of nitrogen applications on golden pennycress. The results for Arv2032 showed several treatments had a significant difference to the control. None of the spring only applications showed any significant difference to the control. The fall only application and all of the applications that consisted of a fall application with an additional spring application, with the exception of the bolting application, showed a significant increase to seed yield, oil content, and oil yield. The results showed that a fall application of fifty pounds of nitrogen incorporated prior to planting is an effective commercial application to increase seed yield, oil content, and oil yield for wild type pennycress lines.