

Effect of irrigation regimes on weed control in organic cranberry production

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Introduction

Quebec is the leading producer of organic cranberries in the world. One of the major issues that compromise organic cranberry (*Vaccinium macrocarpon*) production is weed management. When weeds establish themselves in a cranberry field, they compete with the crop for physical space, create shade that adversely affects pollination and delays fruiting in fields under establishment, causing estimated yield losses of more than 25% of production. Recent experiments have shown that irrigation management based on soil water tension (SWT) allows cranberry plants to grow in soil with optimal moisture levels and develop a deeper root system (Sandler et al. 2004; Bonin, 2009). This should give the cranberry an advantage in reducing competition from weeds. Weed species respond differently to changing water regimes (Bhagat et al., 1999), and soil moisture status following planting is a major factor influencing weed flora composition (Drost and Moody, 1982; Anwar et al., 2010). Excess soil moisture often found in cranberry fields seems to be a key contributing factor in the development of tough perennial weeds (Eck, 1990). In particular, during the planting and establishment of cranberry cuttings, excessive amounts of water are used in order to stimulate root formation and ensure dense, uniform and rapid plant cover in the first year. Optimized irrigation management should allow the cranberry to establish itself and occupy the space while avoiding the invasive establishment of tough perennial weeds.

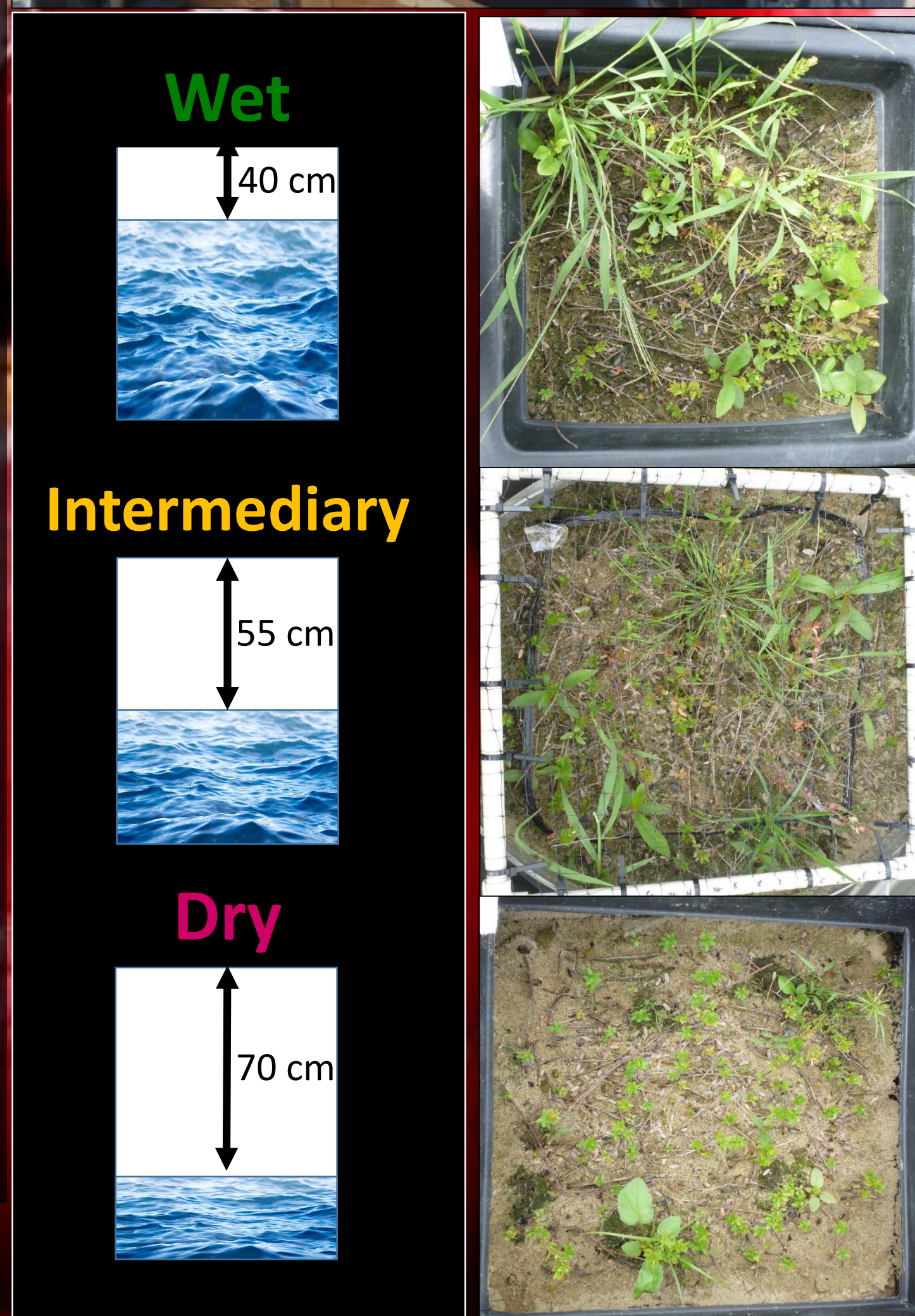
Objectives

Determine the effect of optimal irrigation management on weed control during the establishment of cranberry production

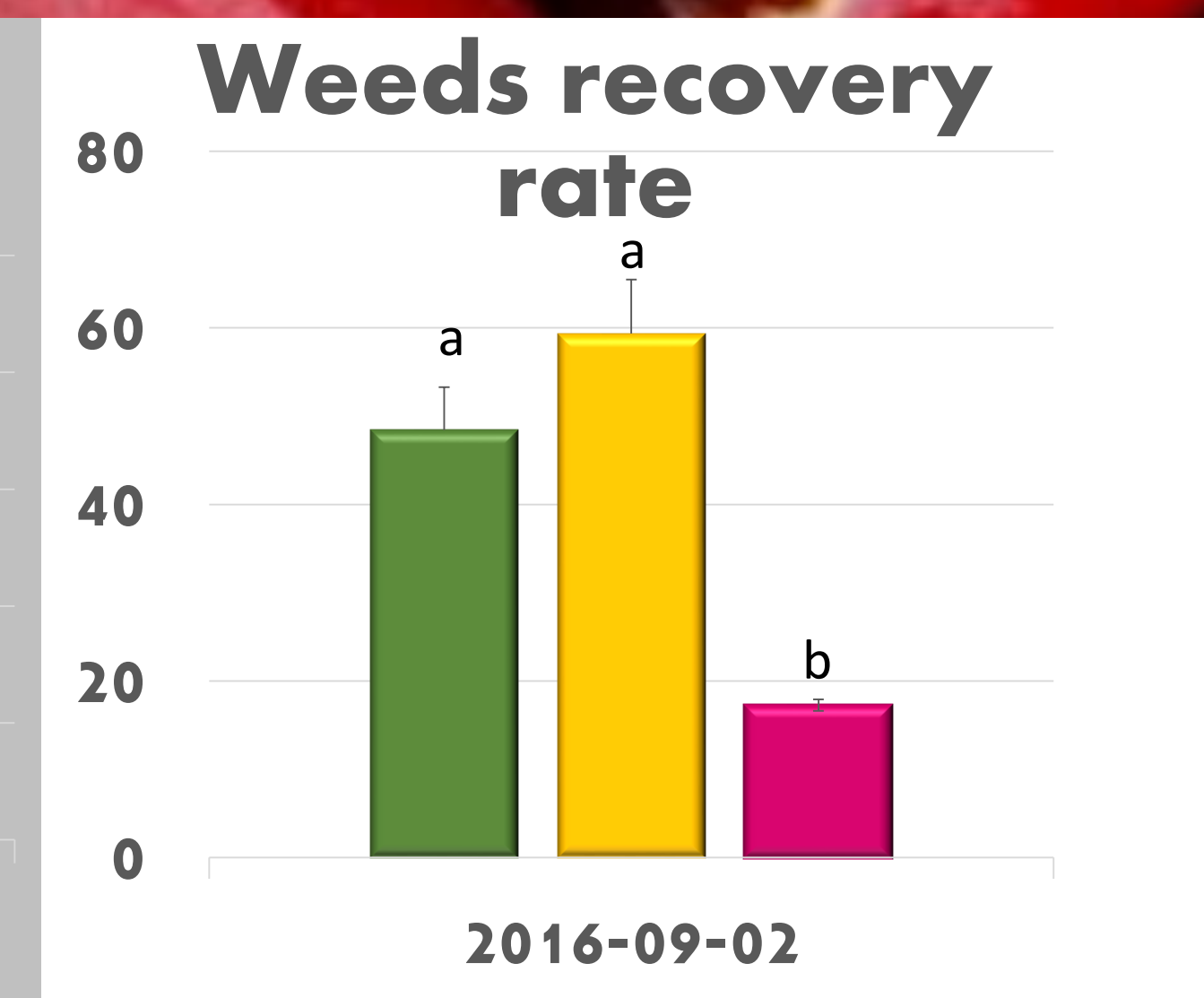
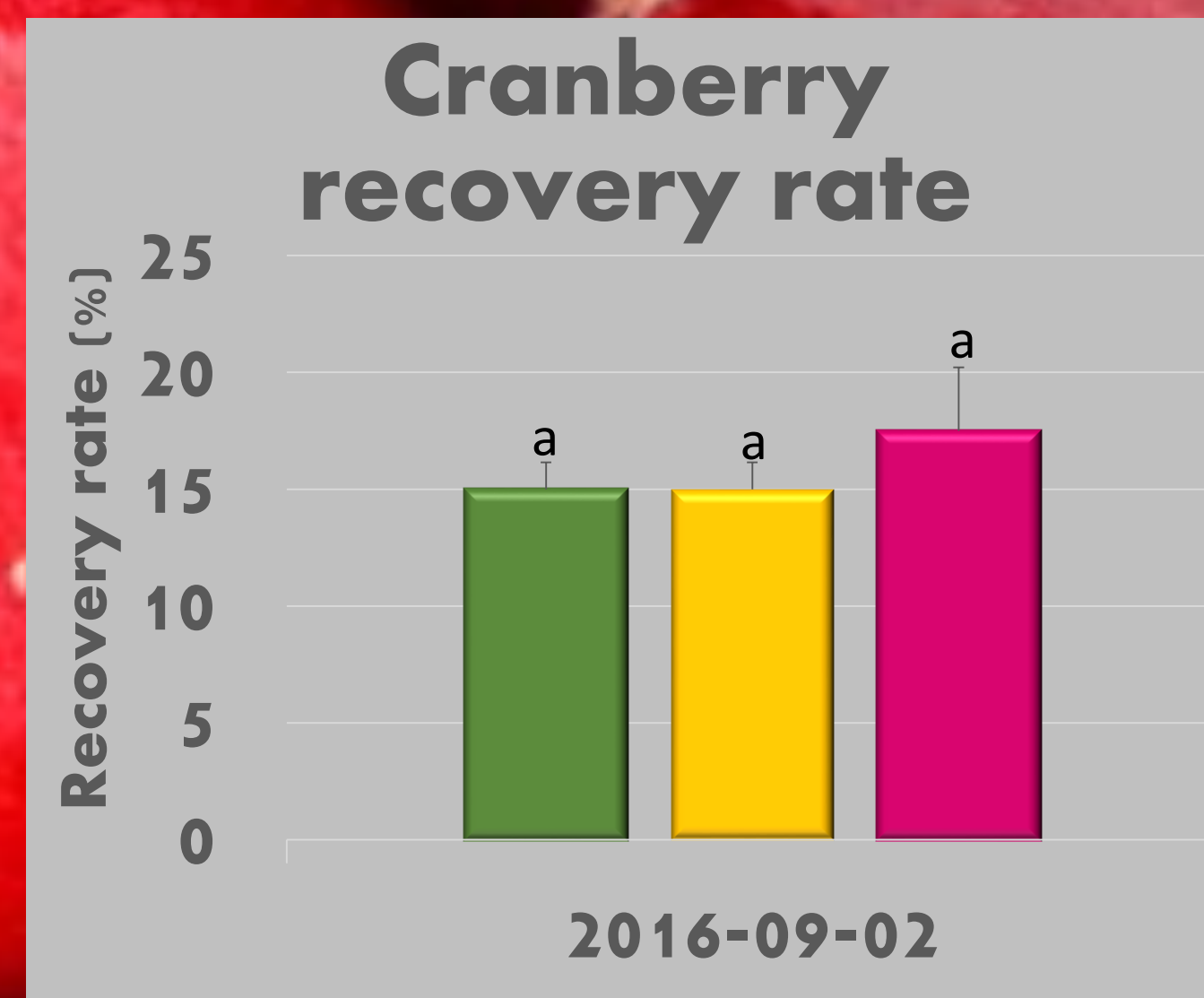
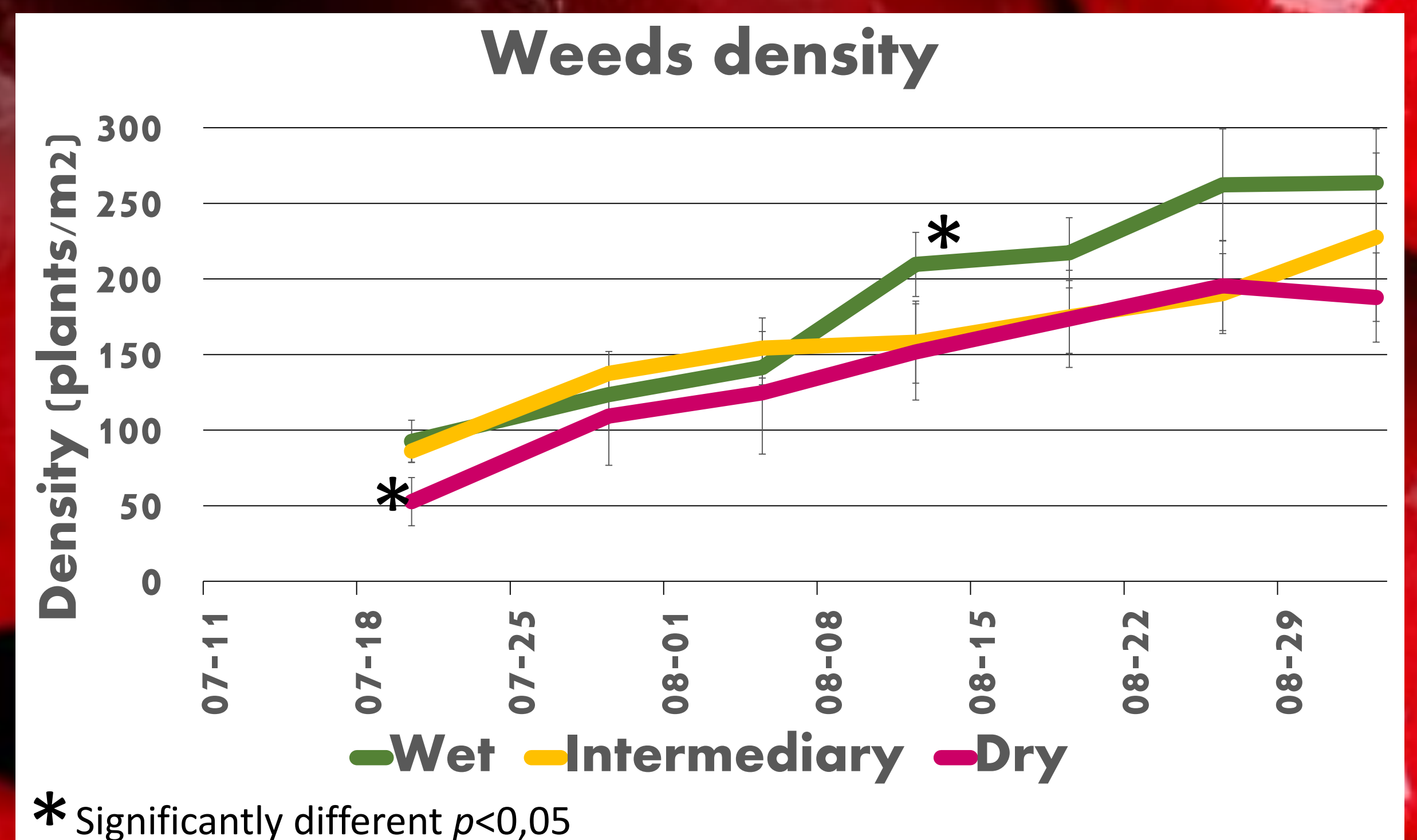
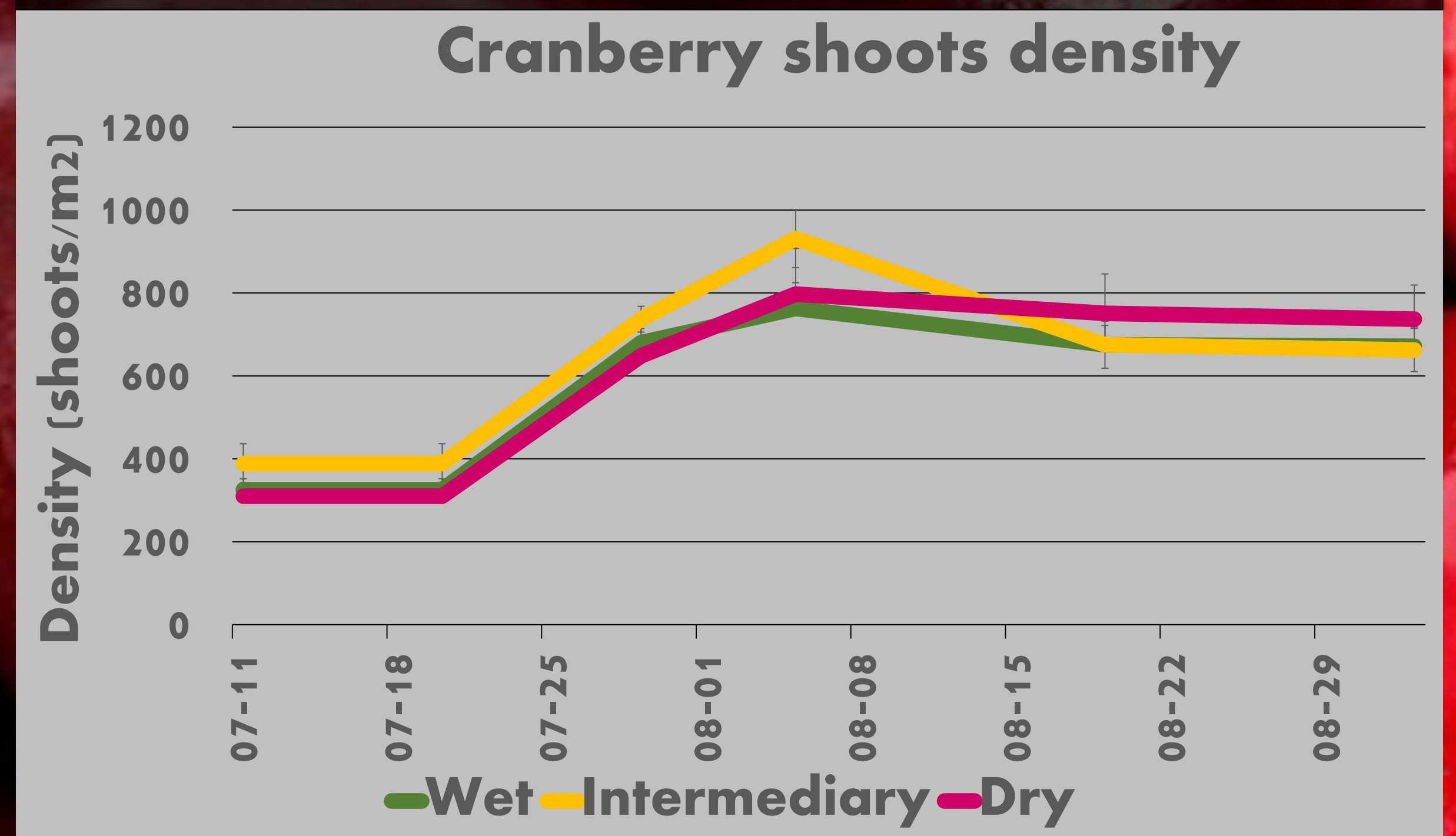
- Determine the rate of recovery and abundance for both weeds and cranberry plants based on different irrigation regimes in cranberry fields under establishment
- Determine whether different irrigation regimes affect the composition of harmful weed flora in cranberry cultivation during establishment

Methodology

For a better groundwater level and soil-moisture tension control, we built an experimental device including three pools with different water levels. In each pool, seven pots were filled with sandy soil from a cranberry field. Cranberry cuttings were planted in June. To stimulate root growth and prevent the cuttings from overheating and burning, a standard wet irrigation (by overhead irrigation and subirrigation) was performed until root density was sufficient to allow the cranberry to draw water, which takes approximately one month. Once this stage was reached three different optimized irrigation regimes were compared and irrigation was done when temperature (32°C) or soil water tension (-5,5 kPa) threshold was reached to simulate different groundwater levels.



Results



Conclusion

The different irrigation regimes do not seem to influence significantly cranberry abundance and recovery rate. However, abundance and recovery rates of weeds are lower in dryer treatment. The composition of weeds community between treatments will be compared later on. Optimized irrigation management seems to be a good way to control weeds.