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Control of soilborne pathogens by managing irrigation of sugar beet.

Two soilborne sugar beet viruses known to occur in the Texas Panhandle, beet necrotic yellow vein virus (BNYVV) and beet soilborne mosaic virus (BSBMV), are transmitted by the fungus *Polymyxa betae*. The incidence and severity of diseases caused by soilborne viruses and fungi can be higher when a precise irrigation schedule is not followed. Fields are often irrigated excessively, based on the assumption that increasing the amount of water applied to the crop increases tonnage. However, this assumption is incorrect when field soils are infested with soilborne pathogens. The goal of this research is to identify the economic threshold of yield reduction due to soilborne pathogens in order to provide growers with useful information to maximize net return by saving water and energy and reducing chemical applications. An experiment was conducted in Bushland, Texas, in order to quantify the effects of different irrigation frequencies on sugar beet yield under disease pressure. Four irrigation regimes (every two, three, four and five weeks) and four inoculation treatments (BNYVV, BSBMV, BNYVV+BSBMV and non-inoculated control) were arranged in a split-plot design replicated four times. Crop growth, soil moisture, disease incidence, yield and sucrose content were evaluated. The treatment irrigated every four weeks showed the lowest disease incidence and a yield that was not significantly different from the treatment irrigated every two weeks. Also, sucrose content was significantly higher in the four-week irrigation treatment than in treatments irrigated every two and three weeks. Plots inoculated with BNYVV had a significantly higher disease incidence than BSBMV and BNYVV+BSBMV treatments. Yields were also significantly affected by the inoculation treatments. Beets in the BNYVV+BSBMV treatment had a significantly higher yield than beets in the BNYVV treatment.