RUSH, CHARLES M. *, GIOVANNI PICCINNI, and KEDEN BURK, Texas Agricultural Experiment Station, P. O. Drawer 10, Bushland, TX 79012. **Development of a disease management system using precision agriculture technology.**

The majority of sugar beets produced in the Western United States are irrigated and in most instances, sugar beet yields are positively correlated with the amount of irrigation water applied. However, when beets are grown in pathogen infested soils, increased irrigation often leads to increased disease and lower root yields and quality. Irrigation amount and frequency can also impact foliar disease development and nematode populations. Therefore, irrigation scheduling is of paramount importance to production of a high yielding high quality crop. Recently, remote sensing with infrared thermometers (IRT) has been used to monitor crop water requirements and to schedule irrigations. However, because plants infected by soilborne pathogens may exhibit the same symptoms as drought stressed plants, IRT based irrigation scheduling may not work in pathogen infested soils. In order to determine whether IRTs or other techniques of remote sensing are able to distinguish between biotic and abiotic stresses, a study was initiated in which IRTs were mounted directly to a center pivot. The crop was scanned twice weekly the day before irrigation. One scan was performed in the middle of the day and the second scan later in the evening after plants had begun to regain turgor. Preliminary results indicate that midday readings with IRTs will not be able to distinguish between biotic and abiotic induced stresses. However, because healthy plants regain turgor more rapidly than plants with root disease, the difference between midday and evening readings may provide a method of differentiating between biotic and abiotic stresses. If this holds true, diseased areas can be mapped and less water can be applied with the use of variable rate nozzling systems.