

# Brown Stem in Florida Celery

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Sporadic outbreaks of a petiole necrosis of celery (*Apium graveolens* var. *dulce*), known locally as "brown stem", have been observed in Florida for over 40 years. In the 1992-93 winter vegetable season, a particularly severe outbreak of brown stem occurred in celery production fields throughout the Everglades Agricultural Area (EAA). One hundred percent of all fields surveyed had some brown stem, with average incidence about 5%. Losses to the industry were estimated at \$5 million. At that time, no specific cause for brown stem had been established. The prevailing opinion was the disease was an environmental or physiological problem. The severe outbreak prompted a more thorough investigation into its cause. The research uncovered a common bacterial pathogen as the origin of the disease.

## Symptoms

Brown stem symptoms consist of a firm, brown discoloration throughout the petiole. Damage is especially evident in the heart region at the base of the stalk, but brown streaks may be seen along most of the length of the petiole (Fig. 1 and Fig. 2). Browning is confined to the ground parenchyma; vascular bundles appear as islands of healthy green among diseased cortical and pith tissues (Fig.3). The

symptoms become more pronounced as celery approaches harvest maturity.

## Causal Agent Isolated and Identified

The isolation and identification of the causal agent of brown stem was recently made. It was demonstrated that brown stem disease of celery is caused by the bacterium *Pseudomonas cichorii*. This is the same pathogen that causes bacterial blight of celery (See Plant Pathology Fact Sheet no. pp-8). Indeed, tests confirmed that bacterial strains recovered from brown stem lesions are indistinguishable from those causing typical bacterial blight lesions on celery leaf blades.

## Spread of the Disease

Reports of brown stem are made only about every five or six years, whereas leaf spot symptoms caused by *Pseudomonas cichorii* are a yearly occurrence. The reasons for the sporadic nature of brown stem outbreaks are unknown. The weather in the winter of 1992-93 was unusual, with frequent rainfall and strong winds. These conditions, along with high humidity, might be essential for brown stem expression. Documented reports of weather conditions linked to brown stem incidence are lacking.

Identification of environmental conditions important to brown stem development is the subject of current research.

### **Prevention and Control**

Do not apply foliar nitrogen during sea-

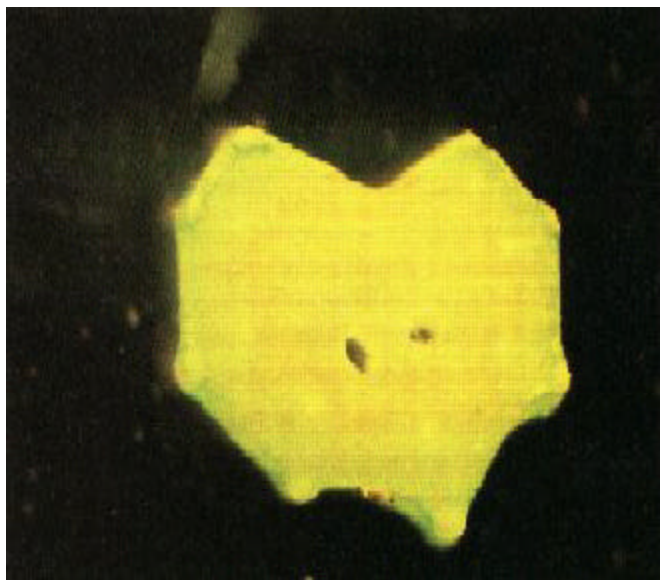
sons favorable for bacterial blight and avoid over-fertilization with soil-applied nitrogen. To help prevent the spread of the bacterium keep workers and farm equipment from brushing against wet plants. Cultivar differences in brown stem susceptibility have been identified by plant breeders at the EREC in Belle Glade.



**Figure 1. Brown streaks along of celery with brown stem damage.**



**Figure 2. Brown stem damage in celery.**



**Figure 3. Brown stem cross section.**