

FUNGICIDAL SUPPRESSION OF PEACH LEAF RUST IN LOW-CHILL SUBTROPICAL GROWN PEACHES

ROBERT E. ROUSE AND PAMELA D. ROBERTS
University of Florida, IFAS
Southwest Florida Research and Education Center
2686 State Road 29 North
Immokalee, FL 34142-9515

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Abstract. Low-chill subtropical peach (*Prunus persica* L. Batsch) varieties with chilling requirements below 250 chill units and commercial quality have been developed in the University of Florida peach breeding program. Low-chill varieties have been successfully fruited in central and south Florida and have commercial production potential. One limitation may be the control of peach leaf rust (*Tranzschelia discolor*) which causes premature leaf loss in late summer during the rainy season which favors disease development. Applications of azoxystrobin (Abound, 0.15 lb ai/A), chlorothalonil (Bravo Weather Stik, 1.06 lb ai/A) or mycobutanil (Nova 40W, 2.4 lbs ai/A) were made at 3 or 6-week intervals to trees that were center pruned or unpruned. Disease severity of rust lesions was assessed at 21 day intervals from August to November 1999. Disease was significantly reduced by applications of mycobutanil at 3 weeks to pruned trees and at 6 weeks to trees pruned or not pruned compared to either control. Disease on trees treated with azoxystrobin were significantly reduced compared to the unpruned control and lower compared to pruned control. Applications of chlorothalonil did not significantly reduce the disease. Trial results show that azoxystrobin and mycobutanil were effective against peach leaf rust and may be instrumental in producing peaches that ripen fruit in a market window when no other peaches are available in April and early May.

The Low-Chill Stone Fruit Breeding Program at the University of Florida in Gainesville, has developed peach varieties adapted to the subtropical climatic conditions of central and south Florida. Yellow flesh varieties, 'Flordaprince', 'TropicBeauty', (Sherman, et al., 1984; Rouse and Sherman, 1989b) and white-flesh varieties 'Flordaglo' and 'TropicSnow' (Sherman and Lyrene, 1989b; Rouse and Sherman, 1989a), are low-chill varieties with melting flesh currently recommended for limited commercial and home gardens of central and south Florida (Williams et al., 1995; Rouse and Sherman, 1998). Additionally, 'UFGold' (Sherman and Lyrene, 1997), a non-melting, yellow-flesh variety, was recently released and is expected to be the first of several new varieties with extended shelf life following harvest.

Growing high quality peaches (*Prunus persica* L. Batsch) with good flavor and size, and low-chilling requirement (less than 300 chill units) in central and south Florida is appealing to homeowners and landscapers, and has caught the interest for commercial production. Peaches, with the above mentioned characteristics, could command high prices for commercial u-pick and local markets because the fruit would

ripen with commercial low-chill, blueberry, blackberry, and raspberry varieties. These fruit would ripen before the earliest higher-chill varieties from north Florida, Georgia, the Carolinas and California, therefore could be economically advantageous. It is important to have several varieties that mature fruit sequentially from mid-April to mid-May to fill the commercial or u-pick market window.

Pest problems have been primarily due to diseases (Rouse and Sherman, 1998). The widely distributed disease of peaches and plums known as bacterial spot [*Xanthomonas campestris* pv. *pruni* (Smith) Dye] has been observed on leaves of all varieties, but has not cause excessive leaf loss until late in the growing season. Another disease, known as leaf rust [*Tranzschelia prunispinosae* (Pers.) Diet.], is considered to be more likely to be limiting to peaches in south Florida because it results in early fall defoliation. Rust builds up quickly after harvest when the summer rainy season begins in mid-June in south Florida. All varieties appeared equally susceptible. It is not uncommon to observe trees to defoliate in late August or September and produce bloom with some re-leafing before winter.

The objective of this study was to evaluate fungicidal suppression of peach leaf rust on low-chill peach leaves grown under humid subtropical conditions in south Florida. The effort was designed to contribute to a production strategy that would encourage the development of peaches as an additional fruit crop to be grown in the home-garden landscape and for commercial u-pick operations and local markets.

Materials and Methods

Four-year-old peach trees of low-chill varieties 'Flordagrande', 'Flordastar', (Rouse et al., 1984; Sherman and Lyrene, 1989a) 'Flordaprince', 'TropicBeauty', 'UFGold', 'Flordaglo', 'TropicSnow', 'TropicSweet' (Rouse and Sherman, 1987), 'Rayon', and four numbered selections budded to Flordaguard peach rootstock and planted at the Southwest Florida Research and Education Center at Immokalee (26°27'N, 81°26'W) were treated with fungicide in 1999. Trees were spaced 15 feet apart in a row, fertilized with a dry soluble complete blend three to five times/year, irrigated with microsprinklers, and maintained weed free beneath the canopy with contact/systemic herbicides.

Trees were paired in rows and summer pruned in June following harvest to remove vegetative growth forming an open bowl shape. Four replications of six, two-tree pairs plus an untreated control were randomized within replication. Fungicide applications were made from June through October of azoxystrobin (Abound, 0.15 lb ai/A), chlorothalonil (Bravo Weather Stik, 1.06 lb ai/A) or mycobutanil (Nova 40W, 2.4 lbs ai/A) were made at 3 or 6-week intervals to paired trees that were center pruned or unpruned. Application of fungicide was made with a hand-gun sprayer and applied till leaf wetness and runoff.

Disease severity of rust lesions was assessed at 21 day intervals from August to November 1999. Data was collected as visual rating of percentage leaf rust infection on leaves of

individual limbs in the field and as leaf rust lesion count on samples of ten leaves collected randomly from each tree and taken to the lab. Area under the disease progress curve (AUDPC) (Shaner and Finney, 1977) was calculated from the mean of lesion data. Statistical analysis was performed on the leaf rust ratings and lesion counts using the SAS General Linear Models Procedure (GLM) with LSD calculated to separate means (SAS Institute, 1982).

Results and Discussion

Visual observation ratings of leaf rust in the field was not discriminatory because no disease increase in control was recorded (Fig. 1). The incidence of observed lesions on leaves and leaf drop during the growing season after the rainy season began was noticeable. However, field ratings of peach leaf rust on selected stems showed a relative flat line during the season and increased for Bravo only in November. This would indicate that, as used, periodic visual ratings for determining leaf rust were an inadequate method to evaluate rust disease severity and needed refinement.

Counting the number of rust leaf lesions per leaf was a good method to evaluate disease severity because the disease increased during the season in the untreated controls (Fig.

2). The slight dip in disease incidence in October (dilution effect) was due to a dilution effect (Van der Plank, 1963) of new growth that occurred in September and loss of old and diseased leaves. Disease incidence increased in November with the controls and treatments with Bravo. Disease incidence with treatments of Abound and Nova remained significantly lower than the controls and Bravo. The data is best displayed as the area under the disease progress curve which represents the total amount of disease estimated for the entire season (Fig. 3). Comparisons are made between the control and treatment. Nova and Abound were not significantly different from each other, and both provided significantly less disease incidence than the non-pruned control. The one exception was Nova at 3-week treatment interval. As discussed below, this was not explained. The 6-week treatment interval was not significantly different from the 3-week treatment interval with either Abound or Nova, with the noted exception.

The highest disease incidence occurred in the non-pruned and pruned untreated controls. Equally high in general were the Bravo treatments. The exception was the Bravo applied at 3-week intervals which was low and the Nova applied at 3-week intervals which was high. The low disease with the 3-week Bravo treatments may have been due to the frequency of application. Bravo is not labeled in Florida for

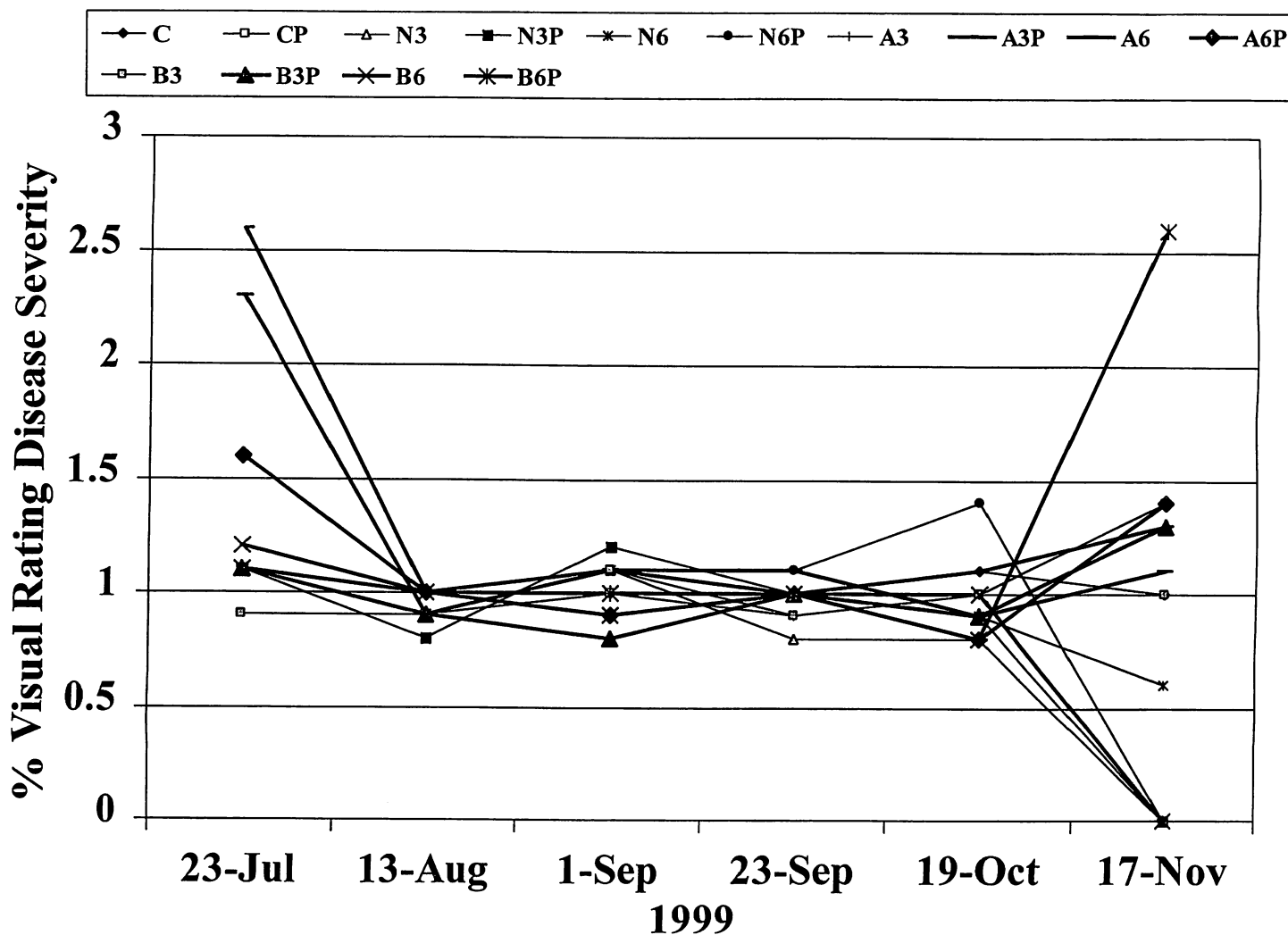


Figure 1. Visual ratings of peach leaf rust in the field at 3-week intervals from July through November, 1999.

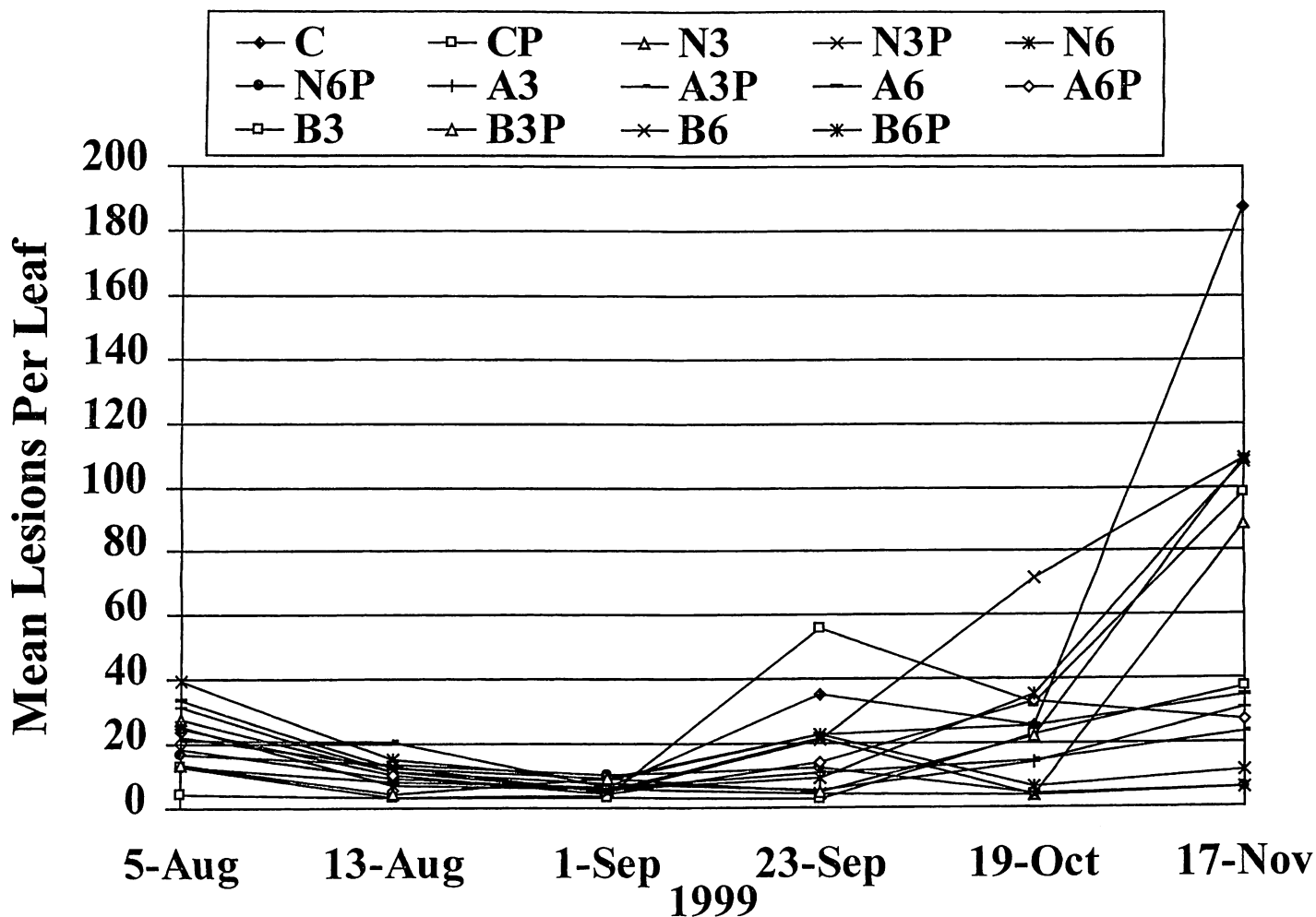


Figure 2. Peach leaf rust mean number of lesions per leaf from August through November, 1999.

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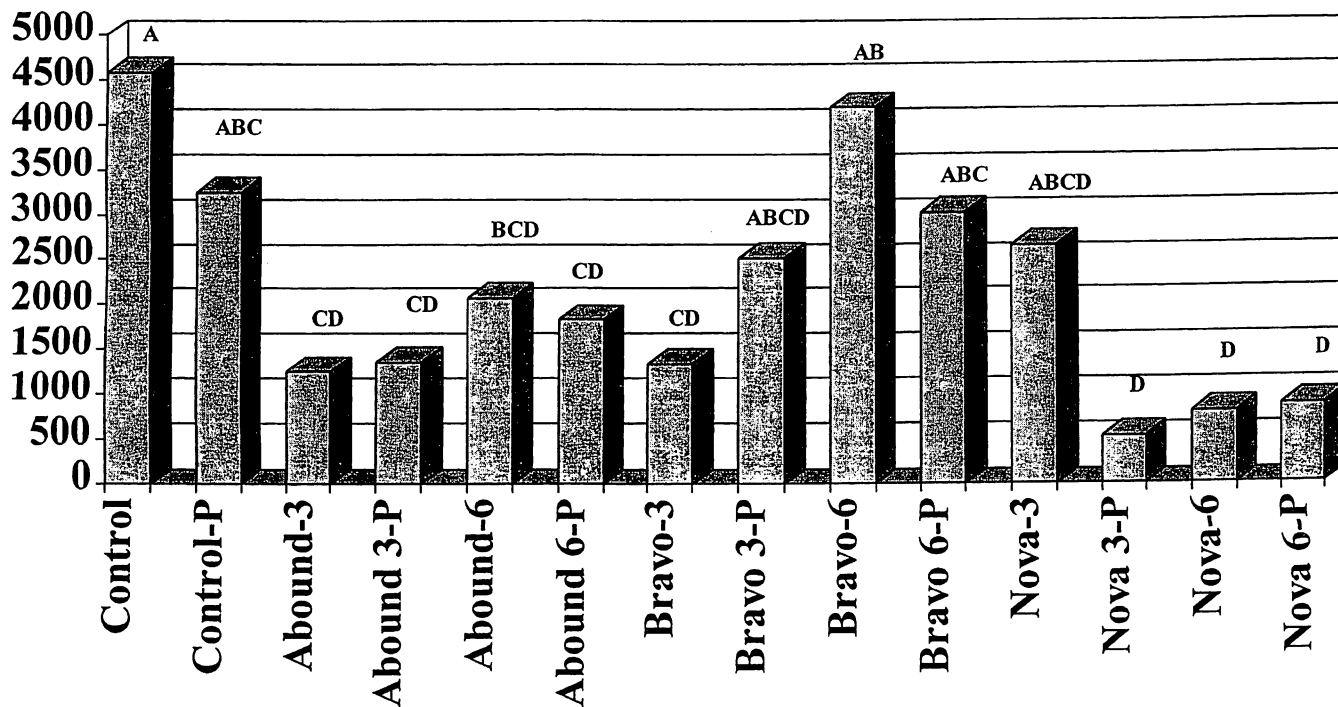


Figure 3. Area under the disease progress curve (AUDPC) for peach leaf rust mean number of lesions per leaf for each treatment.

peach leaf rust but did show some activity in the past under a special section 18 label in the subtropical Lower Rio Grande Valley in Texas. The higher incidence of Nova applied at 3-week intervals above other treatments with Nova is unknown, but is possibly due to sampling error. The level of disease at the beginning of the test was not substantially higher than trees of other treatments.

Statistics comparing pruned and non-pruned trees indicated no significant difference in disease incidence. Pruning to remove center vegetation and allow drying of moisture from morning dew and daytime rains apparently had no effect to reduce the leaf rust disease. Summer pruning practiced in some areas for management of vegetative growth and to reduce the amount of winter pruning had no effect on peach leaf rust in this subtropical area of south Florida.

In summary, low-chill peach varieties can be successfully grown and fruited in south Florida for the landscape and are acceptable for commercial and u-pick operations. The primary production problem appears to be premature defoliation during the summer rainy season due to peach leaf rust. It appears there is no difference among current available varieties to susceptibility to the disease. Two fungicide products, Abound (Zenica Ag Products) and Nova (Rohm and Haas), are labeled for control of peach leaf rust and were found in this study to reduce leaf lesions and disease severity.

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IRRIGATION MANAGEMENT SURVEY FOR TROPICAL FRUIT CROPS IN SOUTH FLORIDA

YUNCONG LI AND JONATHAN CRANE
University of Florida, IFAS
Tropical Research and Education Center
18905 SW 280 Street
Homestead, FL 33031

BRIAN BOMAN
University of Florida, IFAS
Indian River Research and Education Center
2199 South Rock Road
Ft. Pierce, FL 34945

CARLOS BALERDI
Dade County Cooperative Extension Services
18710 SW 288 Street
Homestead, FL 33030

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Abstract. Irrigation is critical management for tropical fruit production in south Florida. Little is known of current irrigation practices used on tropical fruit crops. A survey of avocado, 'Tahiti' lime, mango, carambola, lychee, longan, mamey sapote, and papaya was conducted to obtain background information on current irrigation practices including system, rates, timing, frequency and perceived information needs. The survey was carried out during the summer and fall of 1998 and the data compiled and analyzed in 1999. Of the 108 surveys mailed, 53 commercial growers responded. Irrigation practices varied widely among commodities and growers. This baseline information will give us the opportunity to design extension and research programs to address the needs of growers.

Annual average precipitation in south Florida is about 55 inches, two-thirds of which falls between May and October, during the hot, humid, summer growing season. The dry season typically begins and extends through April of the next year. Irrigation is essential for tropical fruit trees during these months. Little is known about grower irrigation practices for tropical fruit crops grown commercially in south Florida. At present, no documentation is available to define current irrigation practices in the tropical fruit industry. This survey information will be critical in the design and implementation of extension and research programs to address the needs of growers on irrigation practices.