

Phosphorus Soil Test Calibration for Florida Citrus Trees

FDACS Contract #11830

Task #3 Deliverable

Detailed Annual Summary Report 2006 Crop

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Introduction

This is the third deliverable for fiscal year no. 3, which covers the 2006 grapefruit and orange crops in the project “Phosphorus Soil Test Calibration for Florida Citrus Trees.”

Deliverable

Detailed summary report:

1. Tree damage due to Hurricane Wilma in 2005 affected the fruit yield of both the grapefruit and orange trees in 2006. Although enough grapefruit was produced to measure fruit quality, the fruit yield was far below that of a typical year, so it was not measured. The orange trees carried enough fruit to measure yield as well as fruit quality.
2. In August 2006, leaf tissue and soil samples were taken from each plot as usual.
3. Grapefruit and orange trees were harvested in early 2007. Grapefruit size, shape, and peel thickness were measured on a sub-sample of fruit from each tree. Additional fruit subsamples were taken to CREC-Lake Alfred for measurement of internal quality.
4. Response of leaf tissue P to soil test P (Fig. 1):
 - a. Cate-Nelson statistical analysis indicated critical soil test P values of about 5 mg/kg for grapefruit trees and 15 mg/kg for orange trees (see vertical dashed lines illustrating the Cate-Nelson statistical procedure in Fig. 1).
 - b. Grapefruit and orange leaf P values were in the low range only when soil test P was below the critical values, which are interpreted as “very low” (5 mg/kg) and “low” (15 mg/kg) in the current UF-IFAS system.
 - c. In 2005, the critical soil test value for grapefruit trees was 9 mg/kg, also interpreted as “very low” and consistent with 2006 results.
5. Response of fruit yield to soil test P (Fig. 2): Cate-Nelson statistical analysis indicated a critical soil test P value of 5 mg/kg for orange trees, however the relationship between yield and soil test P was not strong.
6. None of the grapefruit external or internal fruit quality responses measured (fruit size, fruit shape, peel thickness, juice Brix, juice acid, Brix/acid ratio) were sensitive to soil test P (Fig. 3).
7. None of the orange internal fruit quality responses measured (juice Brix, juice acid, Brix/acid ratio) were sensitive to soil test P (Fig. 4). Similar results were observed for yield factors measured (lbs juice/box, lbs solids/box, fruit size).
8. Conclusions we have drawn from this experiment:
 - a. Neither grapefruit nor orange trees have been sensitive to soil test P.
 - b. The young trees did not respond to P fertilizer.
 - c. The native soil, although very low in P, has been able to supply tree P needs through 8 years of growth.
 - d. The critical value of Mehlich 1 soil test P for citrus yield and/or fruit quality appears to be in the range of 5 to 15 mg P/kg.

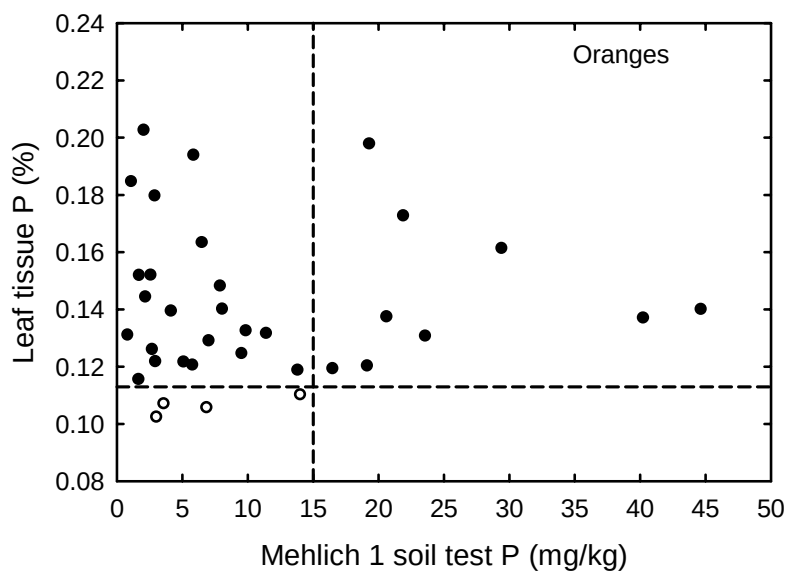
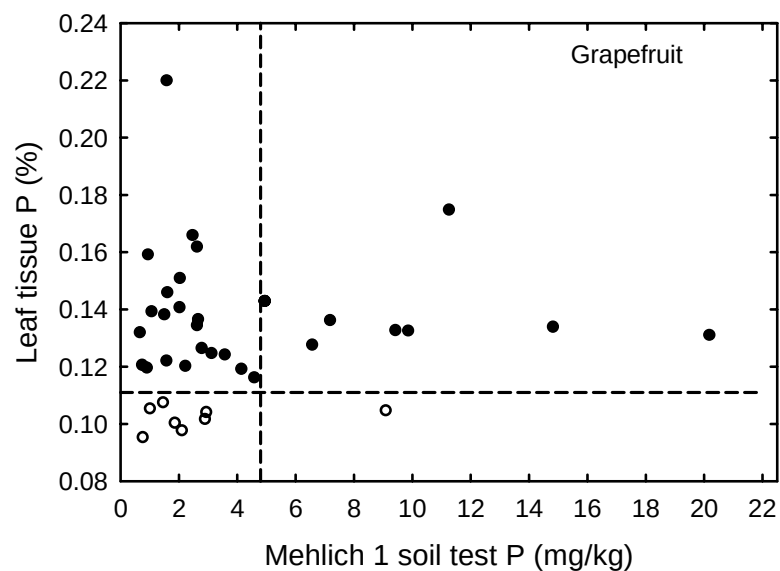


Fig. 1. Response of orange and grapefruit tree leaf tissue P to soil test P in 2006. Open circles indicate low leaf P. Vertical and horizontal dashed lines illustrate the Cate-Nelson procedure used to determine the critical soil test value (X-intercept).

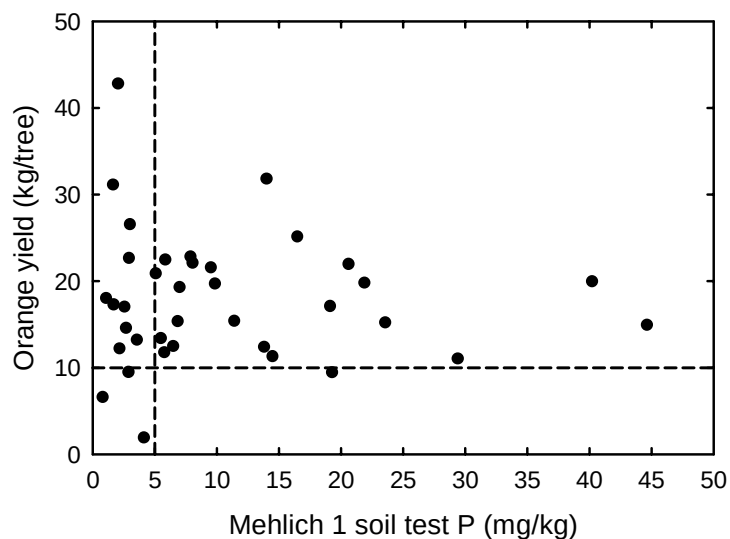


Fig. 2. Response of orange fruit yield to soil test P in 2006. The vertical dashed line identifies the critical soil test value.

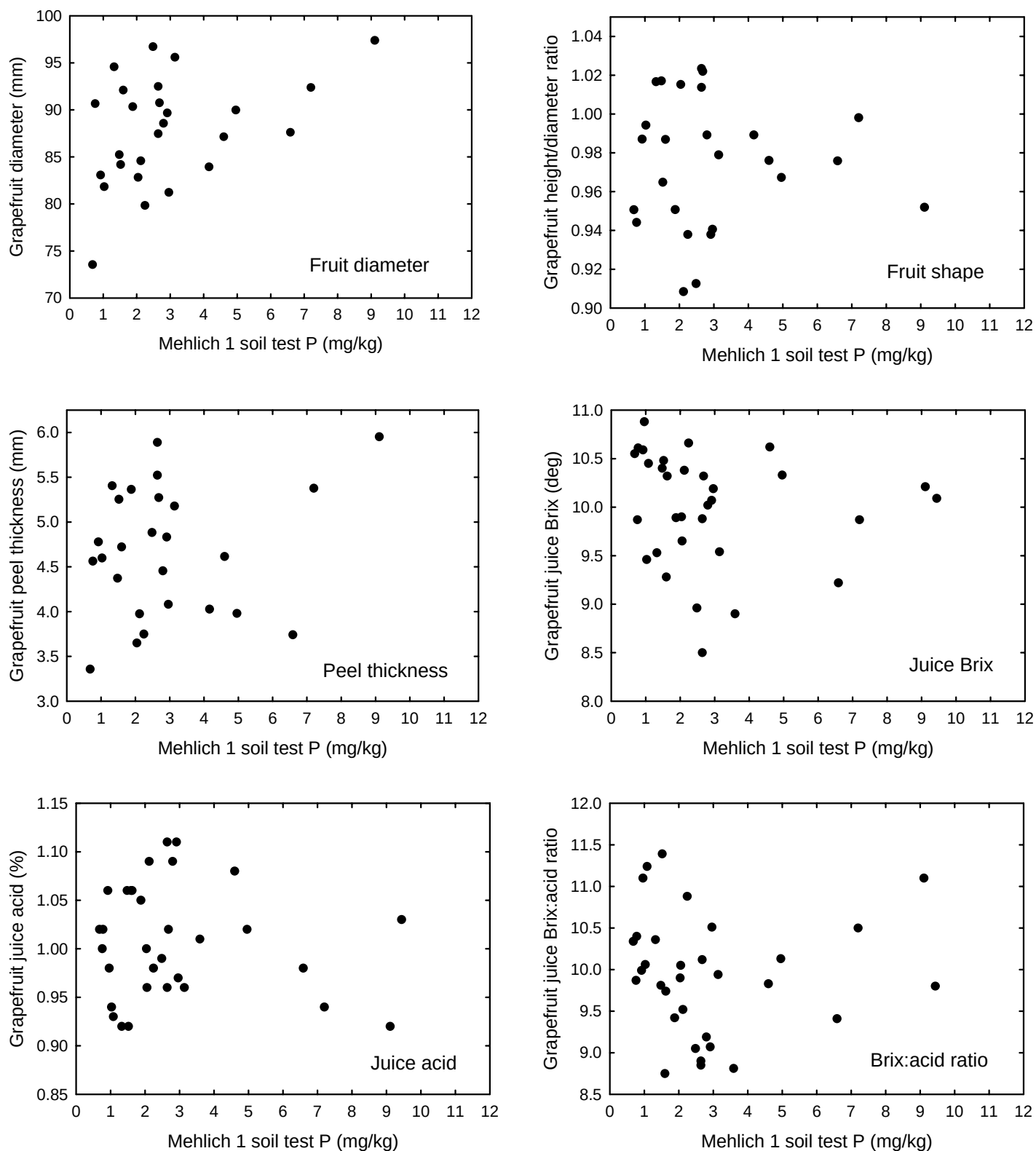


Fig. 3. Response of Flame grapefruit external and internal quality to soil test P in 2006.

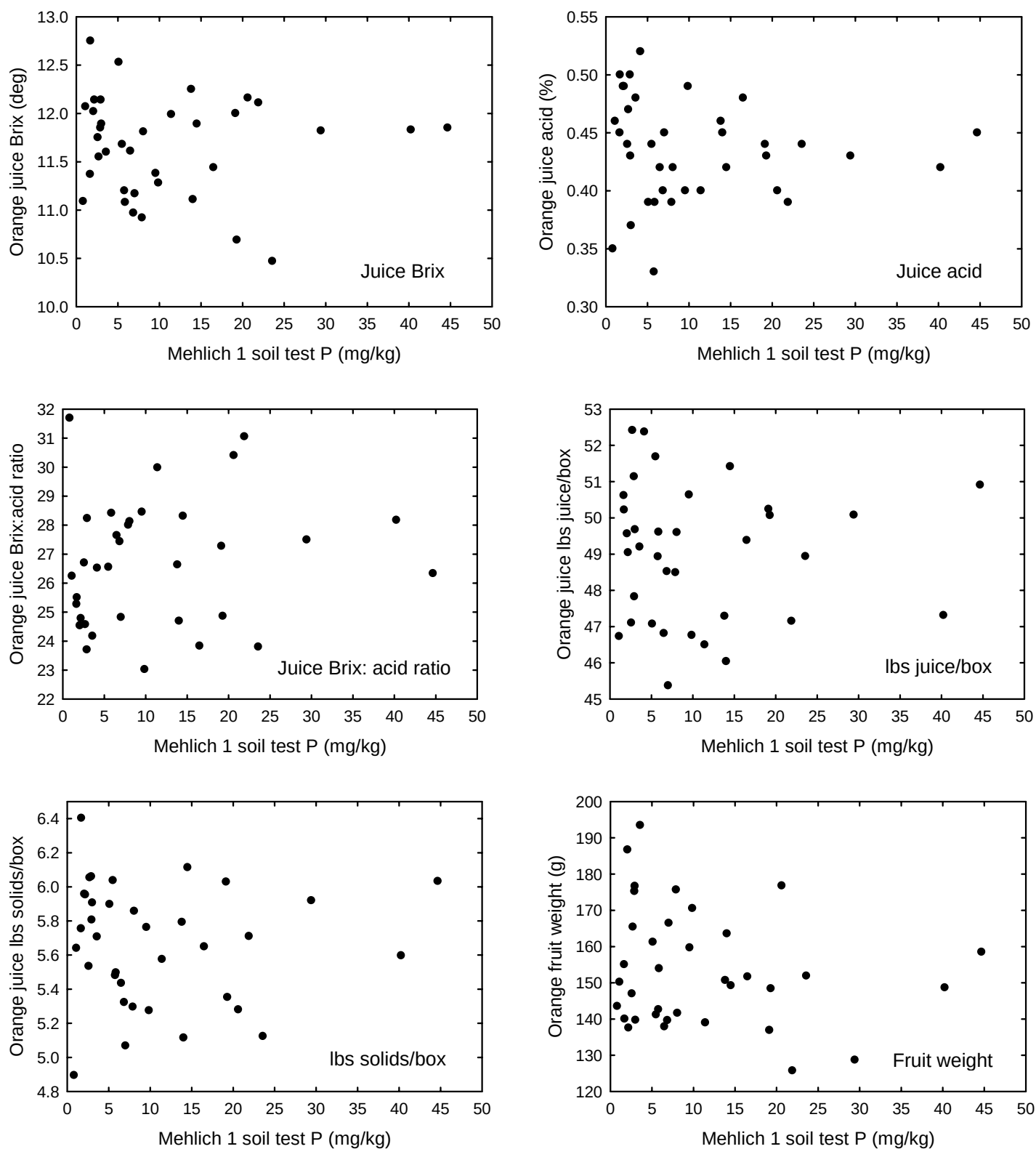


Fig. 4. Response of Hamlin orange juice quality and fruit weight to soil test P in 2006.