UF/IFAS Plant Nutrient Oversight Committee

Meeting Minutes – Dec. 1, 2025, 9:00-11:00am (Zoom)

Agenda

1. Welcome & Introductions (Dukes)
2. Previous meeting minutes (PNOC Meeting Minutes DRAFT (11-4-2025).docx; all review)
3. Miami-Dade bean interim recommendation (PNOC meeting_Bayabil_12012025_Updated.pdf) (Bayabil)
4. NE potato interim recommendation (Zotarelli - PNOC 12-01-2025 - Prelim results potato (Zotarelli)
5. Nutrient Management, 2025 meetings
    a. Potato advisory committee, TBD
6. Future PNOC meetings
    a. Dec. 15, zoom (Dr. Lindsey, Drs. Agehara & Shukla)
    b. Feb. 11, 2026, zoom (Dr. Liu?)
    c. Jun. 3, 2026
    d. Sep. 3, 2026
    e. Nov. 18, 2026

Attendees

Michael Dukes, Samira Daroub, Chris Gunter, Haime Bayabil, Paul White, Andra Johnson, Lincoln, Zotarelli, Yuncong Li, Sanjay Shukla, Jerry Fankhauser, Cheryl Mackowiack, Patrick Marr

Meeting Summary

After the call to order, Dr. Michael Dukes introduced Dr. Paul White, who will lead the Nutrient Management program, and noted that end-of-year interim nutrient rate targets may be delayed. The committee then received presentations on phosphorus management for snap bean production in calcareous soils and potato production in Northeast Florida. Both studies emphasized that legacy soil phosphorus strongly influences fertilizer response and identified total soil P, rather than fertilizer rate alone or any single soil-test extractant, as the most reliable indicator of crop performance. Overall, the findings pointed to moderate total P levels being sufficient for optimal yields, highlighted the need for calibrated soil-test categories tailored to Florida's soils, and underscored the limitations of statewide thresholds. The group also reviewed updates on decision-support tools and timelines for upcoming PNOC recommendations and manuscripts.

Minutes

- Call to Order and Approval of Minutes
    - Meeting called to order at 9:03 AM by Dr. Michael Dukes.
    - Dr. Paul White welcomed, present today.
    - November 4, 2025 minutes reviewed; approval postponed to allow members additional time for review.

- Timeline Updates
    - The target to release interim nutrient recommendations before year-end may not be attainable given current analytical and modeling workload; further refinement needed before PNOC consideration.
- Presentations
    - Optimizing Phosphorus Rate for Snap Bean in Calcareous Soils
        - Presenters: Haime Bayabil & Yuncong Li
        - Study Overview
            - Multi-season investigation assessing P fertilizer requirements and irrigation interactions in calcareous Krome soils, which present unique nutrient-retention challenges.
            - Dataset includes six research-plot seasons and three commercial seasons (328 total plots), conducted in collaboration with TREC, Soil & Water Sciences, and Accursio & Sons.
        - Soil and Production Context
            - Krome soils characterized by pH 7.3–8.2, high $CaCO_3$, and large coarse-fragment fractions from rock plowing, reducing fine-earth volume and P-retention capacity.
            - Background soil P highly variable: 241–490 mg/kg (commercial) vs. 32–112 mg/kg (research).
            - Soil-test P values (Mehlich-3) did not reliably reflect plant-available P, highlighting need for soil- and site-specific interpretation.
        - Irrigation Findings
            - ET-based irrigation matched or exceeded yields from grower-standard irrigation while saving ~1.8 inches water/season (~48,900 gal/ac), demonstrating meaningful water-use efficiency potential.
        - Phosphorus Response Findings
            - Fertilizer P only:
                - Low-P research fields showed yield increases up to a plateau at moderate P rates.
                - High-P commercial fields exhibited flat or even negative responses at high P application rates, indicating legacy P saturation.
            - Total P (fertilizer + legacy P):
                - Mixed-effects linear-plateau model identified an optimal total soil P ≈ 175 lb/ac, a more reliable predictor of marketable yield than fertilizer P alone.
        - Soil-Test and Tissue Diagnostics
            - Mehlich-3:
                - Second sampling (~28 DAP) correlated better with yield; optimum ≈ 102 lb/ac (fine-earth basis).

        - Tissue P:
            - Plateau analysis suggested optimal total soil P ≈ 161 lb/ac.
        - Integrated modeling:
            - Convergent optimum range across approaches = 102–175 lb/ac; multi-model average = 133 lb/ac.
    - Decision-Support Tool
        - Developed fine-earth P conversion system accounting for bulk density, coarse fragments, and rooting depth.
        - Implemented into a calculator converting soil-test P (ppm) → lb/ac and projecting field-specific fertilizer P_2O_5 needs (0–93 lb/ac demonstrated).
    - Interpretation & Implications
        - High background P can obscure fertilizer response, with potential yield reductions at excessive P rates.
        - Evidence confirms moderate total P levels are sufficient for maximum yield.
        - Calcareous soil properties prevent development of a statewide universal M3-P threshold.
        - P recommendations must be field-specific and incorporate soil physical properties and legacy P.
    - Preliminary Recommendation & Next Steps
        - Target total soil P ≈ 133 lb/ac, with adjustments for fine-earth volume.
        - Expected PNOC interim recommendation by March 2026.
        - Manuscript timelines: January 2026 (yield) and July 2026 (modeling/thresholds).
        - Planned: economic evaluation of fertilizer savings and irrigation efficiencies.
- Designing the Phosphorus Recommendation for Potato in Northeast Florida
    - Presenter: Lincoln Zotarelli
    - Study Overview
        - A decade-long (2015–2025) dataset from 17 field trials evaluating P requirements across Entisols and Spodosols in Northeast Florida.
        - Includes comparative assessment of four extractants (Mehlich-1, Mehlich-3, Bray-1, Olsen) and standardized P-rate trials.
    - Soil and Production Context
        - Soils feature high sand content, low P-retention capacity, and wide legacy-P variability.
        - Extractants differ significantly in sensitivity, necessitating extractant-specific calibration.

        - Background soil P ranges encompassed very low to extremely high levels, providing strong calibration conditions for new interpretation categories.
- Phosphorus Response Findings
    - Fertilizer-only response:
        - Low-P sites: strong positive responses.
        - Moderate-P: diminishing returns at moderate rates.
        - High-P: yield often flat or negative.
    - Total soil P: consistently superior predictor of yield behavior; provided well-defined plateau points.
- Extractant-Specific Critical Levels
    - Critical levels (yield plateau thresholds) identified:
        - M1: mid-200 mg/kg
        - M3: mid-400 mg/kg
        - Bray-1: mid-300 mg/kg
        - Olsen: ~50 mg/kg
    - These support development of VL–L–M–H soil-test P categories.
- Relative Yield (RY%) and Crop Removal
    - RY% normalization allowed multi-year, multi-site comparisons.
    - RY targets (80/90/95%) anchored classification boundaries.
    - Crop removal estimates: ~50–100 lb/ac P_2O_5 for typical yields (300–500 cwt/ac), consistent with removal-based fertilizer needs in moderate-P soils.
- Model Synthesis & Decision Tools
    - Multiple models converged on narrower optimal ranges than existing interim recommendations.
    - Late-season M3-P and total soil P ranked highest in predictive strength.
    - New decision-support tools convert extractants (e.g., M1 ↔ M3) and translate ppm → lb/ac for integrated total-P accounting.
- Interpretation & Implications
    - Excess soil P suppresses yield response and may reduce productivity.
    - Moderate soil P conditions align with crop removal–level fertilization, not blanket application rates.
    - Extractant-specific categories are needed; a single statewide threshold is not feasible.
- Preliminary Framework & Next Steps
    - Transition to tiered, soil-test–based P recommendations:
        - Low P → higher fertilizer needs
        - Moderate P → removal-based

        - High P → little/no fertilizer
    - Pending steps include final calibration, publication of relative yield/manuscript findings, coordination with PNOC/BMP groups, and economic analysis of reduced fertilizer use in high-P fields.
- Adjournment
    - After discussion on presented data, the meeting adjourned at 11:00 AM.
    - Next meeting: Monday, December 15, 2025, 10:00-11:00am

Meeting minutes prepared and submitted by Patrick Marr.