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POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM



RESEARCH REPORTS

SUSTAINABLE AQUACULTURE FOR A SECURE FUTURE

Title: Pond soil pH measurement

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Abstract: Soil pH often is measured in samples from the bottoms of aquaculture ponds. Several different techniques for soil pH are used. This study considered the differences in pH obtained by the different methods and determined which methods appeared most useful. Dual electrodes (indicating and reference) and a single-probe combination electrode gave similar pH values when inserted into 1:1 mixtures of dry soil and distilled water. There were slight differences in pH between readings with dual and combination electrodes when the dual electrodes were arranged with the indicating electrode in the sediment phase and the reference electrode in the supernatant phase of the mixture. The two-phase method with the dual electrode does not appear warranted because of greater difficulty in making measurements. Dry soil : distilled water ratios of 1:2.5, 1:5, and 1:10 had progressively greater pH readings than obtained at a 1:1 ratio. Measurements made in 0.01 M CaCl₂ and 1.0 M KCl had much different values than those made in distilled water. Higher pH resulted when pH was measured without stirring or in filtrates of soil-water mixtures. A 20-min period of intermittent stirring before making measurements was necessary for a stable pH value. Particle size did not influence pH in aliquots passing 0.053 to 2.36-mm sieves. Drying temperature had a strong influence on pH, and measurements made on samples dried at 40 to 60 C are probably most reliable. Measurements of *in situ* pH in wet soil with standard pH electrode or a portable acidity tester differed greatly from those made in 1:1 dry soil to distilled water mixtures. Pond bottom soil pH measurement should be standardized. Based

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on findings of this study, the following method is suggested: dry soil at 60 C in a forced-draft oven; pulverize soil to pass a 2-mm sieve; mix soil and distilled water in a 1:1 ratio (weight : volume); stir intermittently with glass rod for 30 min; insert dual electrodes or a combination electrode into the mixture; measure pH while stirring.

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