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## Chemical properties during different development stages of fruit orchards in the mekong delta (Vietnam)

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### ABSTRACT

This study to examine soil fertility status was conducted on 10 citrus plantations in Hau Giang province within the Vietnamese Mekong Delta, Vietnam. Fruit trees are mostly grown on the raised beds to avoid annual flood with alluvial soil type. Soil sampling was done in the dry season of 2010 at two soil depths, for each raised bed. Development ages of raised beds were represented by two groups, young age group ( $\leq 30$  years) and old age group ( $> 30$  years). For chemical analysis, pH, organic matter, CEC, total nitrogen,  $\text{NH}_4^+$ ,  $\text{NO}_3^-$  and exchangeable Ca, Mg and K were determined. The results showed that the pH (water) was strongly acid. The CEC was in average  $19.2 \text{ cmol} \cdot \text{kg}^{-1}$  in topsoil (0 - 20 cm depth) and  $18.7 \text{ cmol} \cdot \text{kg}^{-1}$  in subsoil (20 - 50 cm depth) for young age group. Similarly, the CEC was  $16.7 \text{ cmol} \cdot \text{kg}^{-1}$  in topsoil and  $15.8 \text{ cmol} \cdot \text{kg}^{-1}$  in subsoil for old age group. Organic matter on young age group (7.38 and 5.47% on average for topsoil and subsoil respectively) was significantly higher than that of old age group (5.20 and 3.81% on average for topsoil and subsoil respectively). Total nitrogen was not significantly different between the sites for the age groups of raised as well as the soil layers. Ammonium-N levels were excessive, and  $\text{NO}_3^-$ -N levels were high. Potassium and  $\text{Mg}^{2+}$  were significantly different between age groups of raised beds and the same pattern between soil layers, while  $\text{Ca}^{2+}$  did not vary significantly. Potassium and  $\text{Ca}^{2+}$  levels were moderate,  $\text{Mg}^{2+}$  was high and P levels were very high. Soil fertility in the raised beds subjected to an adverse on plant growth and an imbalance in soil nutrients under low pH conditions. Loss of soil quality was exhibited in reduced organic matter with the aging of raised beds.

### KEYWORDS

Citrus Orchards; Soil Properties; Alluvial Soil; Nutrient Balance; Soil Fertility; Mekong Delta; Vietnam

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### References

- [1] Khoa, L.V., Soil degradation and land conservation with special reference to soil resources in the Mekong delta, Vietnam. Lecture note (vietnamese). CoA, Can Tho University. 2000.
- [2] Ve, N.B. and V.T. Anh, Soil Map of the Mekong Delta 1:250,000 scale based on USDA system. University of Can Tho and 60B Project. 1990.
- [3] General Statistics Office, Statistical Yearbook 2009. 2010, Statistical Publishing House, Hanoi.
- [4] Syers, J.K., Managing soils for long-term productivity. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 1997. 352(1356): p. 1011-1021.
- [5] Oldeman, L.R., The global extent of soil degradation. *Soil Resilience and Sustainable Land Use*, 1994 - Wallingford, UK: CAB International, 1994: p. 99-118.
- [6] Dexter, A. and M. Zebisch, Degradation: Critical Limits of Soil Properties and Irreversible Degradation, in *Encyclopedia of Soil Science*, Second Edition. 2005, CRC Press.
- [7] Phong, L.T., V.T. Hoang, and D. Minh, Citrus. 1996, Agriculture Publisher: Ho Chi Minh City, Vietnam

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(In Vietnamese).

- [8] Chau, N.M., Using Fertilizer for Some Fruit-Trees. Agriculture, Land Resources and Fertilizer Use in Vietnam. 1997: Youth Publisher, Ho Chi Minh City, Vietnam. (In Vietnamese).
- [9] Hau, V.C., Fruit Cultivation in Vietnam. 1999: Agriculture Publisher, Ho Chi Minh City, Vietnam. (In Vietnamese).
- [10] Jones, J.B., Agronomic handbook: Management of crops, soils, and their fertility. 2003, Boca Raton: CRC Press.
- [11] Siem, N.T., How to use NPK fertilizers for a sustainable intensive farming structure. Agriculture, Land Resources and Fertilizer Use in Vietnam. . 1997: Youth Publisher, Ho Chi Minh City, Vietnam. (In Vietnamese).
- [12] Hoa, N.M., Soil potassium dynamics under intensive rice cropping: a case study in the Mekong Delta, Vietnam. 2003, s.n.]: [S.l.
- [13] Foth, H.D., Fundamentals of soil science. 1990, New York: Wiley.
- [14] Soil Survey Staff, Key to soil taxonomy. Handbook, 6th edition. USDA, USA. 1996.
- [15] Soil Science Department, Reports of soil survey and mapping in the Mekong delta, scales 1/25,000 and 1/100,000. Document (Vietnamese). College of Agriculture, Can Tho University, Vietnam. CTU 1985-1996.
- [16] Walkley, A. and I.A. Black, An Examination of the Degtjareff Method for Determining Soil Organic Matter, and A Proposed Modification of the Chromic Acid Titration Method. Soil Science, 1934. 37(1): p. 29-38.
- [17] Brady, N.C., The Nature and Properties of Soils. 8 ed. 1985: Eurasia Publishing House, New Delhi.
- [18] Bray, R.H. and L.T. Kurtz, Determination of Total, Organic, and Available Forms of Phosphorus in Soils. Soil Science, 1945. 59(1): p. 39-46.
- [19] Calabrese, F., Soil and cultural practices. In Giovanni Dugo and Angelo Di Giacomo ed. Citrus: the genus citrus. Medicinal and Aromatic Plants - Industrial profiles, 1027-4502; 26. 2002, London and New York: Taylor and Francis.
- [20] Tan, K.H., Soil sampling, preparation, and analysis. Books in soils, plants, and the environment. 2005, Boca Raton: Taylor & Francis.
- [21] Fu, M.H., X.C. Xu, and M.A. Tabatabai, Effect of pH on nitrogen mineralization in crop-residue-treated soils. Biology and Fertility of Soils, 1987. 5(2): p. 115-119.
- [22] Slattery, J.F., W.J. Slattery, and B.C. Carmody, Influence of soil chemical characteristics on medic rhizobia in the alkaline soils of south eastern Australia. In: Martinez and Hernandez ed. Highlights of Nitrogen Fixation Research. 1999, Kluwer Academic/Plenum Publishers, New York. p. 243 - 249.
- [23] Bruce, R.C. and G.E. Rayment, Analytical methods and interpretations used by the Agricultural