INOCULATION, LIMING AND PHOSPHORUS FERTILIZATION OF TWO FORAGE LEGUMES GROWN IN ANNAM CLAY

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The thesis attached hereto, entitled "INOCULATION, LIMING AND PHOSPHORUS FERTILIZATION OF TWO FORAGE LEGUMES GROWN IN ANNAM CLAY", prepared and submitted by ALICIA D. ALCARAZ in partial fulfillment of the requirements for the degree of Master of Science in Crop Science (Agronomy) is hereby accepted.

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BIOGRAPHICAL SKETCH

The author was born on December 7, 1949 in Lal-lo, Cagayan.

She finished her elementary education as first honor at the Catugan Elementary School in 1962 and her secondary education as valedictorian at the Cagayan Valley Agricultural College (now Cagayan State University, College of Agriculture) in 1966. She obtained her diploma in Associate in Agriculture from the same school in 1968. As an undergraduate fellow of the Agricultural Colleges Association of the Philippines (ACAP), she pursued her Bachelor of Science in Agriculture degree major in Plant Pathology at the University of the Philippines College of Agriculture (UPCA) in 1972.

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She is happily married to Ted M. Alcaraz, Jr. with whom she has three sons - Dennis, Alvin and Mark Anthony.

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ABSTRACT

ALCARAZ, ALICIA D. Institute of Graduate Studies, Central Luzon State University, Muñoz, Nueva Ecija, Philippines, July 1985. INOCULATION, LIMING AND PHOSPHORUS FERTILIZATION OF TWO FORAGE LEGUMES GROWN IN ANNAM CLAY.

Major Adviser: Dr. Miguel L. Aragon

A screenhouse study was conducted from November 1984 to May 1985 on the inoculation, liming and phosphorus fertilization of two forage legumes, namely: Stylosanthes sp. (Cook) and Leucaena leucocephala (Lam.) de Wit. grown in Annam clay soil (pH = 5.2, OM = 1.36%, P = 1 ppm, Al = 1.2 me/100 g).

The treatments consisted of three inoculations (uninoculated, inoculated, and 30 kg N/ha), two levels of lime (0 and 7 t/ha) and two levels of phosphorus (0 and 90 kg P_2O_5/ha). Arranged in a 3 x 2 x 2 factorial in Completely Randomized Design, the different treatments and their effects on the two forage legumes were evaluated in two cutting frequencies.

Inoculation improved the herbage and dry matter yields of Stylosanthes in the first and second cuttings. It also increased nodulation of which nitrogen application failed to do. Likewise, nitrogen

application had favorable effects on the herbage and dry matter yields of the plants in the first cutting but this effect was not significant in the second cutting.

Similarly, the favorable effect of lime on the herbage and dry matter yields of Stylosanthes was evident in the second cutting. In contrast, phosphorus fertilization alone did not show favorable effects to the plant. However, along with inoculation and liming, phosphorus fertilization proved effective in increasing the herbage and dry matter yields of Stylosanthes.

Inoculation and phosphorus fertilization reduced the herbage and dry matter yields, root and nodule weights of Leucaena but with lime application, the herbage and dry matter yields of the plants were increased in the second cutting only. Phosphorus fertilization increased the herbage and dry matter yields of nitrogen-treated plants.

In general, liming the soil increased the pH and exchangeable Ca but decreased the toxic concentrations of Fe, Mn, and Cu.

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