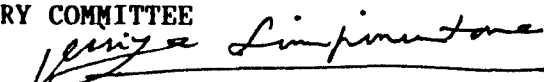


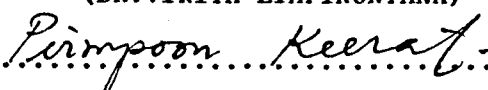
THESIS TITLE EFFECT OF CALCIUM ON GROWTH, YIELD AND SEED QUALITY  
OF PEANUT CV. KHON KAEN 60-3 AND TAINAN 9

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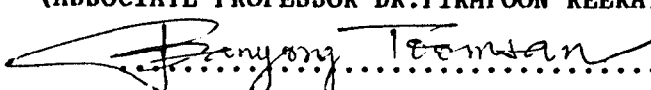
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ABSTRACT

The objective of the experiment was to study the effects of different types and rates of application of calcium fertilizers on growth, yield and seed quality of two peanut varieties. The two varieties were Khon Kaen 60-3, a Virginia with large-size seed and Tainan 9, a Spanish, with small-size seed. The experimental design was a split-plot with peanut varieties as main plots and the combinations of types of fertilizer and application rates as subplots. The three types of fertilizer included gypsum (Ca=17.5%), lime (Ca=38%) and shell ash (Ca=43%). The rates of calcium application were 17.5, 35 and 70 kg of Ca per rai (1 ha = 6.25 rai). Therefore, there were 10 treatments altogether including one control treatment (without Ca). The experiment was conducted under irrigation in the upper paddy field having loamy sand soil with low pH in Khon Kaen.

From this experiment, the results showed that calcium applications did not increase total dry weight (except root) of both peanut varieties. Calcium applications, however, increased pod yield per area and seed quality in Khon Kaen 60-3 variety. In contrast, calcium applications did not increase pod yield of Tainan 9 variety but had some effects on some characteristics of seed quality.

With Khon Kaen 60-3 variety, calcium applications increased both pod and seed yields by 54% and 67%, respectively, when compared with the control treatment. The increase in yields could possibly be related to the increase in the value of harvest index (by 60%), number of seed per pod (by 44%), shelling percentage (by 23%) and seed size (by 13%). Calcium applications increased the percentages of number and weight of seed with large size (diameter  $>0.7$  cm) by 20% and 9%, respectively. The applications also increased germination percentages of seed by 10%. Calcium applications decreased the percentage of number and weight of medium-size seed (diameter from 0.5 to 0.7 cm) by 6% and 14%, respectively. The applications also reduced the percentage of number and weight of small-size seed (diameter  $<0.5$  cm) by 7% and 2%, respectively. Calcium applications decreased the percentages of seed with dark plumule symptom by 6% when compared with the control.

For Tainan 9 variety, applications of calcium did not produce any effects on pod and seed yields, yield components and harvest index. However, the applications increased the percentages of number of large-size seed (diameter  $>0.6$  cm) and

germination percentages of seed by 5% for both characteristics. Calcium applications decreased the percentage of number of small-size seed (diameter <0.4 cm) by 4% when compared with no calcium application. Calcium applications also decreased the percentages of seed with dark plumule symptom by 1.5% when compared with the control treatment.

Without calcium applications, Tainan 9 produced higher values of pod and seed yields, some yield components, harvest index and higher quality of seed than Khon Kaen 60-3. Tainan 9 also had higher percentages of calcium in both young leaves and seed than that of Khon Kaen 60-3. However, Khon Kaen 60-3 had higher seed weight and seedling weight than Tainan 9, presumably due to genetic differences between the two varieties.

Applications of different types of calcium fertilizer did not have any significant effect on the total dry weight (except root), pod and seed yields, yield components, harvest index and percentages of seed with dark plumule symptom of the two peanut varieties. However, gypsum application increased average germination percentages of seeds of both varieties when compared to lime and shell ash applications by 1% and 3.4%, respectively. Gypsum treatment also increased the percentages of number of large-size seed of Khon Kaen 60-3 when compared with lime and shell ash applications by 7.7% and 6.7%, respectively.

Different rates of calcium application in this experiment did not have any effects on total weight (except root), pod and seed yields, yield components and harvest index of the two peanut varieties. With one exception, i.e. the application of

calcium at the rate of 17.5 kg/rai significantly increased total dry weight (except root) when compared to the other two application rates.

Application of calcium at higher rate decreased the percentages of number of small-size seed and increased germination percentages of both peanut varieties. The highest germination percentages of seed were obtained from the treatments with the use of 35 and 70 kg/rai for Khon Kaen 60-3 and from the treatment with the use of 70 kg/rai for Tainan 9 variety. For different types of calcium fertilizer, the percentages of germination of seed only increased with the increase in rates of application of both calcium fertilizers, i.e. lime and shell ash.