

Thesis Title Relationship between Honey Bee (*Apis mellifera* L.) Population Density and Longan Fruit Setting

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Abstract

The relationship between honey bee (*Apis mellifera* L.) population density and longan fruit setting was studied. Fruit set reached highest percentage 21.18 ± 3.19 % where 12,000 bees/ 1,600 m² were introduced, whereas 18.62 ± 2.80 % reached with 36,000 bees/1,600 m². The percentage fruit set was only 12.76 ± 1.67 % where honey bee population were non-introduce or non-existent. They were statistically significant when percent fruit set was increased by introducing densities of bees ($p < 0.05$). A strong and significant correlation was shown ($P = 0.02$) where $Y = 9.29 + 9.46X$ ($r^2 = 0.78$). When managed colonies of 12,000 bees/1,600 m² were provided, the annual value attribute to *A. mellifera*, V_{hb} was parameterized for a set of assumptions and calculated to be 16,285.50 baht/rai/year.

Daily observation were made to monitor local fauna of pollinators during 0600-1800 hr. The greatest number of *A. mellifera* was 6.02 ± 1.25 bees/9 male-flowers panicles/day, then declined to 4.61 ± 0.77 and 1.49 ± 0.37 during 1000-1400 hr and 1400-1800 hr respectively.

The quantitative evaluation of pollinators has shown the 15 morphospecies : honey bee (*Apis mellifera* L.) 68.29 % indian honey bee (*A. cerana* F.) 2.58 % draft honey bee (*A. florea* F.) 4.35 % giant honey bee (*A. dorsata* F.) 0.46 % stingless bee (*Trigona* spp.) 8.17 %, wasps (*Vaspa* sp.) 1.04 % carpenter bee (*Xylocopa* sp.) 0.08 % black ant (*Componotus compressus* F.) 6.01 % house fly (*Musca domestica* L.) 3.58 % blow fly (*Chrysomyia* sp.) 1.19 % syrphid fly (*Syrphus* sp.) 1.62 % green weevil (*Hypomyscus squamosus* F.) 1.39 % butter fly (Eucromiid) 0.92 % damselflies (*Agriocnemis* spp.) 0.08% and mango leaf hopper (*Idioscopus* spp.) 0.19 %. The average percent relative variation, RV for *A. mellifera* was 2.87 %.

Field investigation were in longan orchards revealed the total of 25 different weed species : wild poinsettia (*Euphorbia heterophylla* L.) 17.16 % bermuda grass (*Cynodon dactylon* (L.) Pers.) 13.52 % coat buttons (*Tridax procumbens* L.) 10.77 % torpedo grass (*Panicum repens* (L.) 8.59 % tropical crabgrass (*Digitaria bicornis* (Lmk.) Roem & Schult.) 8.42 % and purple nutsedge (*Cyperus rotundus* L. spp. *rotundus*) 6.82 %, calculating Shannon-Wiener index (H'), Margalef's index (species richness) and Modified Hill's ratio (equitability) to be 2.16, 3.25 and 0.70 respectively.