

ANT DIVERSITY AND ABUNDANCE IN THREE TYPES OF COCOA PLANTATION

By

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ABSTRACT

The objectives of this research were (1) to observe ant diversity and abundance in three types cocoa plantation and (2) to correlate ant abundance and environmental factors in the cocoa plantation. Observations were done on cocoa plantations type 1 (cocoa plantation with less shade trees, 6.9%), type 2 (cocoa plantation with medium shade trees, 13.6%), and type 3 (cocoa plantation with more shade trees, 52.3%). The plantations were located at Cipadang Village, Gedongtataan Subdistrict, Pesawaran District-Lampung. Ant sampling was done at 15 sample points on each cocoa plantation type using three methods, i.e. manually (for tree-dwelling ants), using pitfall traps (for soil-surface active ants), and using winkler (for litter dwelling ants).

Results showed that ant diversity and abundance vary between cocoa plantation types. Highest ant diversity index was shown by cocoa plantation type 2 (Shannon's index = 1.92 for litter ants, 1.54 for surface-active ants, and 1.77 for tree ants). Ant diversity index decreased in plantation type 3 (Shannon's index = 1.13 for litter ants and 0.74 for tree ants) and in plantation type 1 (Shannon's index = 0.75 for surface-active ants).

Ant morphospecies assemblage in cocoa plantation type 2 was more similar to that in plantation type 3 (Sorensen's index = 76,7%) than that in plantation type 1 (Sorensen's index = 56.7%). Ant morphospecies assemblage in plantation type 1 and that in plantation type 3 were less similar (Sorensen's index = 53.6%).

The highest abundance of litter and tree ants was found in cocoa plantation type 3. More shade trees in cocoa plantation increased abundance of those ants. Abundance of soil surface-active ants did not differ between cocoa plantation types.

The most dominant ant morphospecies in cocoa plantation types were as follow. Plantation type 1: *Monomorium* sp. 2 (in litter and cocoa trees) and *Pheidologeton* sp. 1 (on soil surface). Plantation type 2: *Pheidologeton* sp. 1 (on

soil surface and litter) and *Dolichoderus* sp. 1 (in cocoa trees). Plantation type 3: *Hypoponera* sp. 1 (on soil surface), *Pheidologeton* sp. 1 (in litter), and *Dolichoderus* sp. 1 (in cocoa trees).

Environmental factors in cocoa plantation that positively correlated with litter ant abundance were litter thickness ($r = 0.77^{**}$ in plantation type 1, $r = 0.65^{**}$ in plantation type 2, $r = 0.64^{**}$ in plantation type 3), soil pH ($r = 0.63^{*}$ in plantation type 1, $r = 0.71^{**}$ in plantation type 2, $r = 0.67^{**}$ in plantation type 3), and soil moisture content ($r = 0.53^{*}$ in plantation type 1, $r = 0.52^{*}$ in plantation type 2, $r = 0.61^{*}$ in plantation type 3). Soil temperature and litter C/N did not correlate with litter ant abundance.

Keywords : diversity, abundance, dominance, ant, cocoa plantation.