TERMITE POPULATION IN OIL PALM PLANTATION AND THE EFFECT OF DIFFERENT WATER TABLE ON *COPTOTERMES CURVIGNATHUS* IN PEAT SOIL

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ABSTRACT

TERMITE POPULATION IN OIL PALM PLANTATION AND THE EFFECT OF DIFFERENT WATER TABLE ON *COPTOTERMES CURVIGNATHUS* IN PEAT SOIL

A study on termite population under oil palm plantation and the effect of different water table in peat soil on *Coptotermes curvignathus* was conducted at MPOB Sessang Research Station, Sarawak. The objectives of this project are to determine termite species and their foraging pattern using rubber wood stake in oil palm plantation**,** and to study the effect of different water table on pest termite *Coptotermes curvignathus* in lysimeter filled with peat soil. The study was conducted within nine plots constructed at three different locations: young palm (deep peat), mature palm (medium peat) and mature palm (deep peat). Each plot, measured at 20 m x 30 m, contained 30 rubber wood stakes driven at five meters apart. Rubber (*Hevea brasiliensis*) wood stake with a dimension of 30 cm x 5 cm x 5 cm was used as the detector. The populations detected consisted of two families, with five subfamilies and seven termite species. The subfamilies were Coptotermitinae, Rhinotermitinae, Macrotermitinae, Nasutitermitinae and Termitinae. The first subfamily consisted of three species; *Coptotermes curvignathus*, *Coptotermes sepangensis* and *Coptotermes kalshoveni*. The other four species were *Schedorhinotermes sarawakensis*,*Macrotermes gilvus*, *Nasutitermes* sp. and *Globitermes* sp. The percentage of infestation on rubber wood stake at deep peat plot with young palm was 87.8%, while at the matured palm area planted in medium and deep peat recorded 37.8% and 50% respectively. A significant difference of $X^2_{(1,180)} = 29.965$, $p>0.05$ detected at deep peat area with young and mature palm on termite infestation at wood stake. The mean wood consumption for the *Coptotermes curvignathus* population over a period of one month in a single station was 171.63 ± 9.01g (54.57%) higher than other species in Coptotermitinae subfamily, with *Coptotermes kalshoveni* and *Coptotermes sepangensis* consumed 32.17% and 26.04% respectively. Study on the termite population over time indicated that higher incidence of destructive termites at the younger palm compared to mature palm planted in deep peat area. After nine months (three rounds of sampling**,**) the population was dominated by *Coptotermes curvignathus*. Four water tables at 15 cm, 30 cm, 50 cm and 70 cm (control) from soil surface were tested on *Coptotermes curvignathus* in lysimeter. The percentages of survival are low with 14% and 29% survival rate at the 15 cm and 30 cm water table. The survival rate at 50 cm and 70 cm (normal water table) were 42% and 60% respectively. Excavation of the soil at seven days after treatments showed that 55.6% manage to survive after increasing the water table. There was also a significant difference ($P<0.05$) on termite survival mean to the depth of water table from analysis of variance.

ABSTRAK

Satu kajian populasi anai-anai di ladang kelapa sawit di tanah gambut dan kesan beberapa aras air ke atas Coptotermes curvignathus di tanah gambut telah dijalankan di MPOB Sessang, Sarawak. Objektif kajian ini adalah untuk mengesan spesis anai-anai dan pergerakannya menggunakan pancang kayu getah (Hevea brasiliensis) serta kesan beberapa aras air ke atas populasi anai-anai perosak Coptotermes curvignathus menggunakan "lysimeter" diisi dengan tanah gambut. Kajian tersebut telah dijalankan di dalam sembilan plot pada tiga lokasi berbeza: pokok muda (gambut dalam), pokok matang (gambut sederhana dalam) dan pokok matang (gambut dalam). Setiap plot berukuran 20 m x 30 m menggunakan sebanyak 30 pancang kayu getah berukuran 30 cm x 5 cm x 5 cm telah digunakan sebagai stesen pengesan ditanam pada jarak 5m di antara satu sama lain. Kajian populasi ini mendapati sebanyak tujuh spesies anai-anai telah dikesan dari dua famili meliputi lima subfamili. Subfamili tersebut adalah Coptotermitinae, Rhinotermitinae, Macrotermitinae, Nasutitermitinae dan Termitinae. Subfamili pertama mengandungi tiga spesies iaitu Coptotermes curvignathus, Coptotermes sepangensis dan Coptotermes kalshoveni. Empat spesies lain pula adalah Schedorhinotermes sarawakensis, Macrotermes gilvus, Nasutitermes sp. dan Globitermes sp. Infestasi anai-anai di kawasan pokok muda gambut dalam mencatatkan 87% manakala pokok matang di kawasan gambut sederhana dalam dan gambut dalam mencatatkan sebanyak 37.8% dan 50% serangan sahaja. Terdapat perbezaan bererti di antara infestasi anai-anai dikawasan gambut dalam antara pokok muda dan matang ($X^2_{(1,180)} = 29.956$, $p>0.05$). Purata berat kayu yang telah dimakan oleh koloni Coptotermus cuvignathus dalam masa sebulan untuk satu stesen adalah 171.63 ± 9.01g (54.57%) lebih tinggi dari subfamili Coptotermitinae yang lain. Coptotermes kalshoveni dan Coptotermes sepangensis memakan sebanyak 32.17% dan 26.04% sahaja. Kajian ke atas populasi anai-anai dan waktu mendapati lebih banyak serangan anai-anai perosak di kawasan pokok muda berbanding pokok matang di kawasan gambut dalam. Selepas sembilan bulan(tiga pusingan persampelan) populasi tersebut telah didominasi oleh Coptotermes curvignathus. Kajian ke atas empat aras air iaitu 15 cm, 30 cm, 50 cm dan 70 cm(kawalan) dari permukaan tanah telah diuji ke atas populasi Coptotermes curvignathus menggunakan "lysimeter". Peratus anai-anai yang terselamat adalah rendah iaitu 14% dan 29% sahaja pada aras air 15 cm dan 30 cm. manakala pada aras air 50 cm dan 70 cm (paras air normal) adalah 42% dan 60 % sahaja. Ekskavasi yang dijalankan selepas tujuh hari selepas rawatan mendapati sebanyak 55.6% populasi anai-anai tersebut masih hidup selepas paras air dinaikan. Analisa varian juga mendapati terdapat perbezaan bererti ($P<0.05$) terhadap populasi yang terselamat dengan paras air.