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Evaluation of Neopeace®, Neopeace-F101®, and Malaysia Assurance Rats Glue® for Trapping *Musca domestica* (Diptera: Muscidae) in the Field

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Abstract

The potential of the fly adhesives Neopeace®, Neopeace-F101®, and Malaysia Assurance Rats Glue®, for trapping synanthropic flies, was studied in the field. The objective was to compare the efficiency of the 3 adhesives. A chicken farm in Tumbuk, Kuala Langat District, Selangor, 85 km from Kuala Lumpur, was selected as the study site. Twenty pieces of hardboard and 20 pieces of plastic were placed on the ground. Each surface was sprayed with color and impregnated with glue. Bait, chicken intestines, was placed on the center surface to attract houseflies. The numbers of houseflies trapped were counted after 2 hours. The results showed that all 3 glues trapped houseflies efficiently in the field. Malaysia Assurance Rats Glue® was the most efficient ($p < 0.05$). The most attractive color for houseflies was yellow ($p < 0.05$). Field comparisons of the surfaces demonstrated that hardboard outperformed plastic for trapping houseflies ($p < 0.05$). Neopeace® and Neopeace-F101® were equally efficient for attracting both sexes of housefly, while Malaysia Assurance Rats Glue® tended to attract females. The results indicated that all 3 types of glue could be recommended for use in a fly-control program.

Keywords: Neopeace®, Neopeace-F101®, Malaysia Assurance Rats Glue®, *Musca domestica*

Introduction

Houseflies are very widely distributed insects; it is estimated that there are no fewer than 15 species in Malaysia alone [1]. There are 170 genera and 4,200 species in the Family Muscidae, some of which are medically important, including the housefly, *Musca domestica* [2]. Insects are classified as vectors when they transmit pathogenic organisms from humans (or animals) to humans. Houseflies play a role in

transmitting viruses, bacteria, and protozoa such as *Entamoeba histolytica*, *Giardia lamblia*, eggs of *Ascaris lumbricoides*, *Trichuris trichiura*, *Taenia* spp, *Hymenolepis* spp, *Dipylidium* spp, *Diphyllobothrium* spp, and *Enterobius vermicularis* [2,3].

Houseflies prefer odiferous breeding sites, such as the droppings of domesticated birds, cows' and pigs' feces, rubbish dumps, corpses, and food [3]. *M. domestica* has started to demonstrate insecticide resistance, such as to DDT. Therefore, housefly-control programs should not only depend on insecticides for long term applications, some alternative ways should be utilized, such as electrical grid with UV light, or the traditional way

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using sticky flypaper [4]. Traps with sticky surfaces have generally been used to control populations of Lepidoptera; this method is easier, cheaper, and convenient to transport. However, the stickiness of the surfaces gradually decreases with time. In fact, total numbers of insects trapped depend on several factors, including the color of the trap, its size, shape, location, and the prevailing weather [5].

For physical control, sticky flypaper containing sugar has been used effectively to catch flies [2]. Adhesive substances, including banding resins, greases, mixtures of oil and grease, polyisobutylene, and viscous oils, have been effectively employed to trap Diptera [6]; commercial non-drying sticky adhesives, such as "Deadline", "Stickem", "Tanglefoot" [7], "Bostik", and "Permanently Tacky Adhesive" [8,9], and various other materials [10]. Sticky traps were found to be 7 times more effective than box traps for collecting the stable fly, *Stomoxys calcitrans* (Linnaeus), on the Gulf beaches of Florida, USA [11].

In this paper we compare and evaluate the stickiness and efficiency of Neopeace®, Neopeace-F101®, and Malaysia Assurance Rats Glue® against *M. domestica* in the field.

Materials and methods

In this study, three types of commercial adhesives were tested—Neopeace®, Neopeace-F101®, and Malaysia Assurance Rats Glue®. Neopeace® and Neopeace-F101® were designed especially to trap flies, whereas Malaysia Assurance Rats Glue® specialized in trapping rats. Rat glues are sticky and smelly; therefore, we tested them for their effectiveness in trapping house flies.

Neopeace® is an aerosol spray containing the active ingredient polybutene 32% w/w in a 250-ml bottle. Neopeace-F101® is an aerosol spray that contains a sex pheromone designed to attract fruit flies. The active ingredients are polybutene 16% w/w and methyl eugenol 3% w/w. Agriculture Chemical (M) Sdn Bhd manufactures both Neopeace® and Neopeace-F101®. Malaysia Assurance Rats Glue®, manufactured by Kian Huat

Trading Company, is highly effective for catching rats. The main ingredient, latex, provides it with its stickiness and odor.

The adhesives were sprayed onto surfaces to attract and trap flies. Two kinds of surfaces, hardboard and plastic, were used to test housefly landing preferences. The hardboard was rectangular in shape, 210 mm wide, 297 mm long, and 2.5 mm thick. The OHP transparency plastic was of the same dimensions, and was manufactured by CBE Sdn Bhd.

The surfaces of the hardboard and plastic were color sprayed with 5 colors—red-33, yellow-12, blue-23, green-27, and black-30—to compare housefly attraction preferences. The codes were references for the manufacturer, Dovechem Industries (M) Sdn Bhd. After spraying, the surfaces were left for one day to eliminate excess odor.

The research site, with an area of 23.8 m x 15.0 m, was a chicken farm belonging to Lek-Ko 9 Sdn Bhd, in Tumbuk, Kuala Langat District, Selangor, 85 km southwest of Kuala Lumpur. Studies were conducted between 0900-1100 h daily for 5 days, 21-25 December 2005. Testing was conducted for five replicates.

Twenty sheets of hardboard and 20 plastic sheets were divided into 4 groups, each containing 5 sheets of hardboard and 5 plastic sheets; each sheet was sprayed with one color; altogether, there were 5 colors per group. The first group was sprayed with Neopeace®, the second with Neopeace-F101®, Malaysia Assurance Rats Glue® was applied to the third, and the fourth had no adhesive and served as control for the others. Chicken-intestine baits (100 g) were placed in the center of each surface. After 2-hour exposure (0900-1100 h), the total numbers of houseflies caught were counted, by sex.

Results and discussion

Fig 1 shows the total numbers of male *M. domestica* trapped by different adhesives on hardboard and plastic surfaces. Malaysia Assurance Rats Glue® was significantly better than Neopeace® and Neopeace-F101® in trapping male houseflies (p

< 0.05), while there was no significant difference between Neopeace® and Neopeace-F101® ($p > 0.05$). A total of 532 male *M. domestica* were trapped by Malaysia Assurance Rats Glue®, 56 by Neopeace F-101®, and 86 by Neopeace®. Similarly, Malaysia Assurance Rats Glue® trapped a significantly higher number of female *M. domestica* in the field ($p < 0.05$) (Fig 2). A total of 990 female *M. domestica* were trapped by Malaysia Assurance Rats Glue®, 42 by Neopeace F-101®, and 64 by Neopeace®. There was no significant difference in the number of female *M. domestica* trapped by Neopeace F-101® and Neopeace® ($p > 0.05$).

An integrated system, consisting of fly-traps and sticky plates using Neopeace®, was shown to trap a large number of species, and some abundantly [12]. Neopeace-F101® and Neopeace® adhesives trapped a large number of houseflies, compared with Polypol® adhesive. However, Neopeace-F101® was more effective than Neopeace® in trapping the fly species *Chrysomya megacephala*, *Lucilia cuprina*, and *M. domestica*, in Malaysia [13].

The most attractive color for male *M. domestica* was yellow (Fig 1). Female houseflies were similarly attracted to yellow in all types of adhesives studied. However, with Malaysia Assurance Rats Glue®

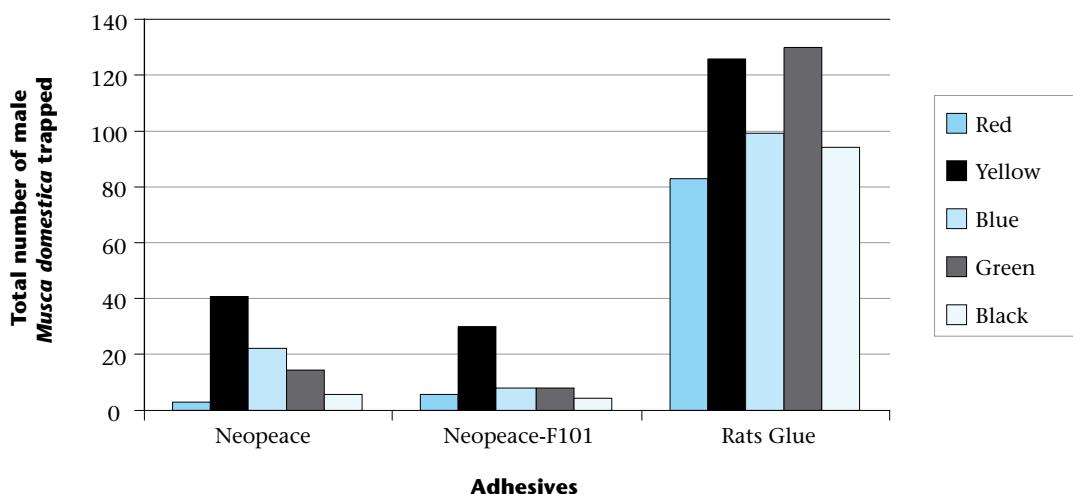


Fig 1 Numbers of male *M. domestica* trapped by different adhesives on hardboard and plastic surfaces.

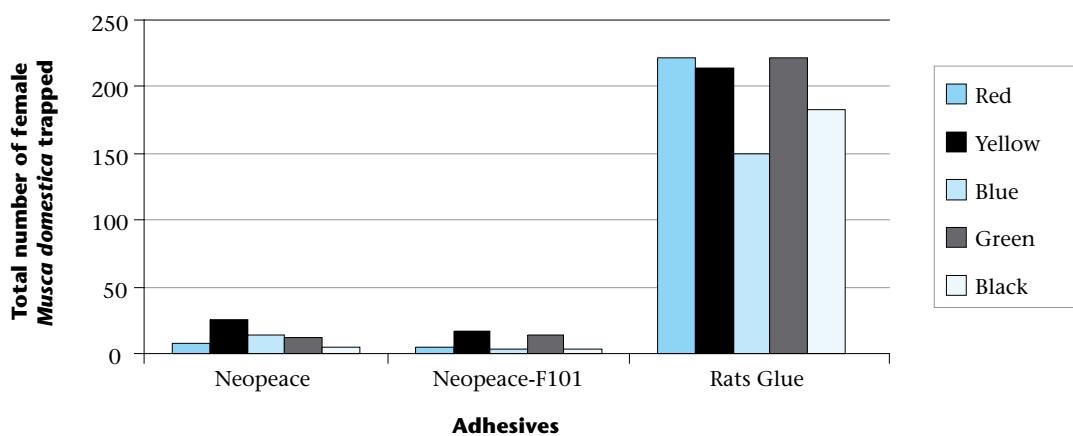


Fig 2 Numbers of female *M. domestica* trapped by different adhesives on hardboard and plastic surfaces.

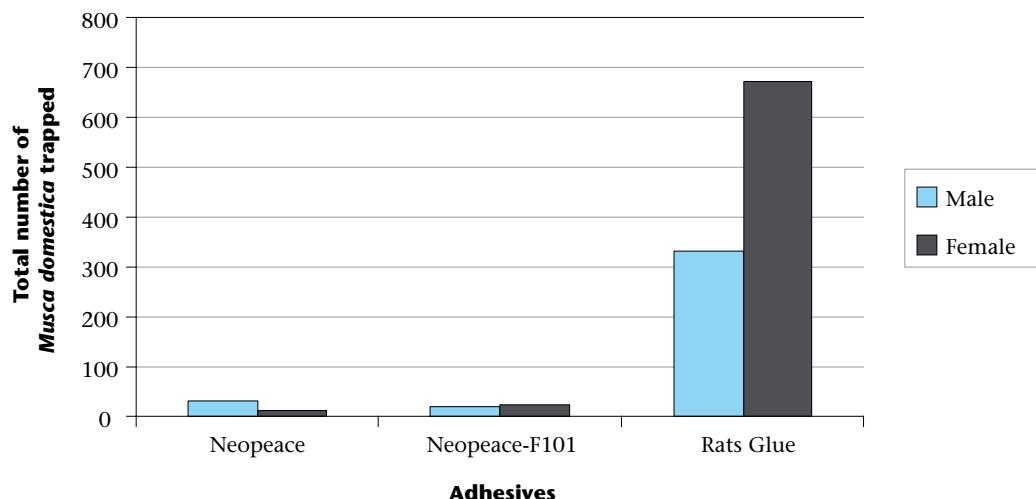


Fig 3 Numbers of *M. domestica* trapped by different adhesives on hardboard only.

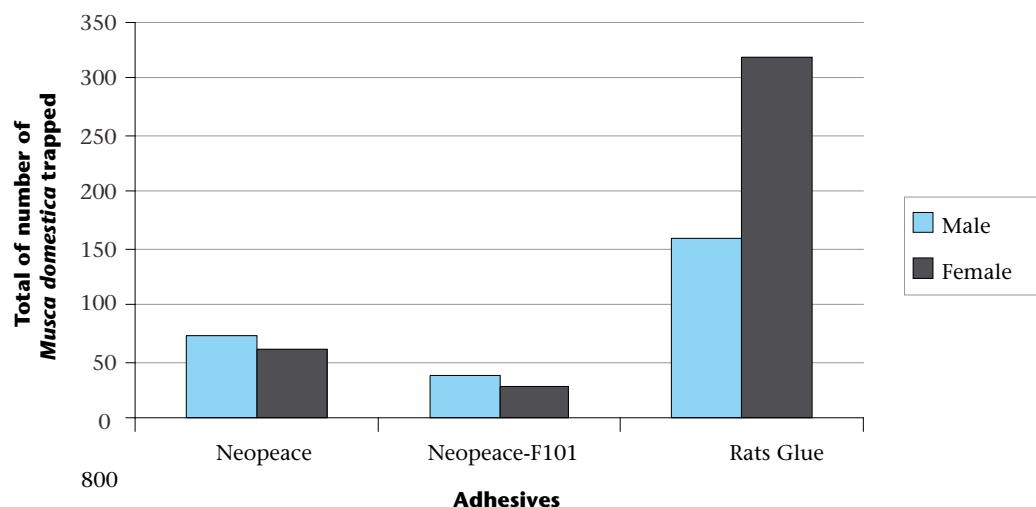


Fig 4 Numbers of *M. domestica* trapped by different adhesives on plastic only.

almost equal numbers of female *M. domestica* were attracted to red and yellow colors, respectively. Studies by other researchers [14] showed that yellow (z)-9-tricosene-baited traps caught significantly more *M. domestica* than white ones.

Figs 3 and 4 show that there was no significant difference between the hardboard and plastic surfaces when trapping male or female houseflies with Neopeace® or Neopeace-F101® ($p > 0.05$). However, Malaysia Assurance Rats Glue® on hardboard caught more houseflies than plastic ($p < 0.05$).

In conclusion, Malaysia Assurance Rats Glue® on yellow hardboard was the best trap in the field for catching *M. domestica*. Thus, glues might be of potential use in controlling housefly populations in the field.

Acknowledgements

We wish to thank Universiti Kebangsaan Malaysia (National University of Malaysia) for providing research facilities. Thanks also to Agriculture Chemical (M) Sdn Bhd Penang, Malaysia for providing Neopeace® and Neopeace

F-101®, and Kian Huat Trading Company, Klang, Malaysia for providing the Malaysia Assurance Rats Glue®.

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