

Komunikasi Pendek/Short Communications

**Flies Specimens Collected from Agricultural Park,
Teluk Cempedak and Bukit Pelindung in
Kuantan, Pahang**
(Spesimen Lalat dari Taman Pertanian, Teluk Cempedak dan Bukit
Pelindung di Kuantan, Pahang)

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ABSTRACT

*This study was carried out in Agricultural Park, Teluk Cempedak and Bukit Pelindung at Kuantan, Pahang in October 2007. These three areas were different in ecological characteristic, Agricultural Park is a lowland region in Kuantan rural area, Teluk Cempedak is Kuantan's most famous beach, and Bukit Pelindung is a reserved rainforest which is 200 meters from the sea level. Fly specimens were collected using four different kinds of baits: dry prawn, salted fish, pork and mango. Each of these baits was placed in a plastic container and exposed for one hour to attract flies. Within 5 minutes, flies started swarming around the baits. The flies were more attracted to the pork and salted fish compared to the other two baits. Fifty one flies, one moth (Lepidoptera) and one wasp (Hymenoptera) were collected. In Agricultural Park, two *Lucilia cuprina*, one *Chrysomya megacephala* and one *Sarcophaga* sp. were collected. For Teluk Cempedak beach, there were two *Sarcophagids*, 31 *Chrysomya megacephala*, five *Musca domestica*, one *Lucilia cuprina* and one moth were caught. Flies collected from Bukit Pelindung included five *C.megacephala*, two *Sarcophagids*, one *Musca domestica* and one wasp. Most *C.megacephala* were attracted to the pork and salted fish.*

Key words: Agricultural Park, Teluk Cempedak, Bukit Pelindung, Kuantan, Fly collection, Chrysomya megacephala, Lucilia cuprina, Musca domestica, Sarcophagid.

ABSTRAK

*Kajian ini dilakukan di Taman Pertanian, Teluk Cempedak dan Bukit Pelindung di Kuantan, Pahang pada bulan Oktober 2007. Ketiga-tiga tempat ini adalah berbeza dari segi ciri ekologi. Taman pertanian adalah kawasan tanah rendah di pedalaman Kuantan, Teluk Cempedak adalah pantai terkenal di Kuantan manakala Bukit Pelindung merupakan hutan simpanan yang berketinggian 200 meter dari aras laut. Spesimen lalat dikumpulkan menggunakan empat jenis umpan: udang kering, ikan masin, daging khinzir dan buah mangga. Setiap umpan akan diletakkan dalam kotak plastik yang berasingan dan didedahkan di udara untuk menarik lalat. Selepas lima minit, lalat mula berkumpul di sekitar umpan. Lalat lebih tertarik kepada daging khinzir dan ikan masin jika berbanding kepada umpan lain. Sejumlah lima puluh satu lalat, satu kupu-kupu (Lepidoptera), dan satu lebah (Hymenoptera) berjaya dikumpulkan. Di Taman Pertanian, dua *Lucilia cuprina*, satu *Chrysomya megacephala* dan satu *Sarcophaga* sp. dikumpulkan. Untuk pantai Teluk Cempedak, dua lalat *Sarcophagid*, tiga puluh satu *Chrysomya megacephala*, lima *Musca domestica*, satu *Lucilia cuprina* dan satu kupu-kupu ditangkap. Lalat yang dikutip daripada Bukit Pelindung termasuklah lima *C.megacephala*, dua lalat *Sarcophagid*, satu *Musca domestica* dan satu lebah. Banyak *C.megacephala* tertarik kepada daging khinzir dan ikan masin.*

Kata kunci: Taman Pertanian, Teluk Cempedak, Bukit Pelindung, Kuantan, Pengumpulan lalat, Chrysomya megacephala, Lucilia cuprina, Musca domestica, Sarcophagid.

Flies (Diptera), especially blowflies, are usually the first organisms to arrive at a corpse, sometimes within minutes of death, and they are also the species of greatest forensic importance (Goff 2000; Byrd & Castner 2001; Arnaldo et al. 2005).

All valid uses of forensic entomology are based on accurate identification of the species. The movement of a body from one site to another may result in an improbable fly fauna and open a new avenue of investigation. There are increased reports of maggots infestation of the elderly or the infirm. This result from abusive conditions or neglect by relatives, or in nursing homes and hospitals. Here again the species and its growth rate can be used to pinpoint culpability. This take taxonomic skill and knowledge of fly habits (Greenberg & Kunich 2002).

The studies of Kano, Kurahashi, Shinonaga and Nishida provide valuable information on the carrion flies of Japan and the Pacific region. The monograph edited by Fan (1992) and Xue & Chao (1996), offer monumental coverage of Chinese Dipteran. In Malaysia, several distribution studies done by Omar et al.

(2003a) at seven locations of different altitude along Titiwangsa, Gombak and Kuala Lumpur. While, Nazni et al. (2007) conducted flies' collection studies at six different ecological habitats in Putrajaya.

With the above work as guides for those regions, the forensic entomologist must, nevertheless, be familiar with the habits of the local flies. The presence of a species on a corpse in an unlikely habitat is reason to suspect that body was moved (Greenberg & Kunich 2002)

This preliminary report presented the flies population in three different habitats, such as beach (Teluk Chempedak), rural area (Agricultural Park) and reserved forest, which is 200 meters above the sea level (Bukit Pelindung). Teluk Cempedak is a famous beach and tourist destination. The baits were place on the beach approximately 20 meters away from the South China Sea. Agricultural Park is a low land rural area surrounded with secondary forest. Rare in human activities and the baits were placed near to the grassland. Bukit Pelindung is the highest point in Kuantan town, and it was visited by people in the morning and afternoon because of the jungle trek and sport facilities. Baits were placed at the peak (200 m) inside a resting hut.

This study was conducted in the afternoon of 16 October and 17 October 2007. Four types of different baits were used to compare which are the best baits to attract flies. The four baits are 50 gram of salted fish (defrosted), 50 gram of pork (defrosted), 50 gram of dry prawn (defrosted) and 50 gram of fresh mango. Each bait was put inside a plastic container and exposed to the selected habitat for one hour (1500-1600). The distant of each bait is about one meter apart. The flies will be collected using a hand net or plastic bag. Collected flies specimens were killed by chloroform 10%, pinned and kept in the Department of Parasitology & Medical Entomology, Faculty of Medicine, Universiti Kebangsaan Malaysia.

For Agricultural Park (ambient temperature at 34°C), two *Lucilia cuprina*, one *Chrysomya megacephala* and one *Sarcophaga* spp. were collected (Table 1). There was one yellow jacket (Vespididae) visited the salted fish within 8 minutes after exposure. It tore a little portion of the salted fish and carried away. Ants (Formicidae) were attracted to the dry prawn, salted fish and mango. *Sarcophaga* spp. was the first species of fly to arrive (after 20 minutes of exposure) and it came to the dry prawn, and then salted fish. *Chrysomya megacephala* came to the salted fish after exposed for 45 minutes. *Lucilia cuprina* was the third comer, it arrived at the pork after 55 minutes.

The next day afternoon (temperature 31°C), two *Sarcophaga* spp., 31 *Chrysomya megacephala*, five *Musca domestica*, one *Lucilia cuprina* and one moth (Lepidoptera) were collected at Teluk Cempedak beach. Within five minutes, several *C. megacephala* came to the salted fish and pork. *Sarcophaga* spp. arrived at the pork later. *M. domestica* came to the pork too. However, there was no fly attracted to the dry prawn and mango.

TABLE 1. Flies specimens collected from different habitats in Kuantan areas according to species

	Agricultural Park	Teluk Cempedak	Bukit Pelindung	Total
<i>C.megacephala</i>	1	31	5	37
<i>Sarcophaga sp.</i>	1	2	2	5
<i>Musca domestica</i>	0	5	1	6
<i>Lucilia cuprina</i>	2	1	0	3
Total	4	39	8	51

On the same day, some flies were collected from Bukit Pelindung, where the altitude was 200 meters high from the sea level. Flies species included five *C. megacephala*, two *Sarcophaga* spp., one *Musca domestica* and one wasp (Hymenoptera). Within one minutes after exposed those baits to the environment, the flies' flying sound can be heard from far. *C. megacephala* were more attracted to the pork and salted fish (Table 2).

TABLE 2. Flies specimens collected from different baits in Kuantan areas according to species

	Pork	Salted fish	Dry prawn	Mango	Total
<i>C.megacephala</i>	31	6	0	0	37
<i>Sarcophaga sp.</i>	3	2	0	0	5
<i>Musca domestica</i>	3	3	0	0	6
<i>Lucilia cuprina</i>	2	1	0	0	3
Total	39	12	0	0	51

In this study, 51 adult flies have been collected. More female flies were caught than male flies. This result was similar to Omar et al. (2003b) where they found more female flies captured. In our study, we noticed that there was more flies caught on the pork (39 flies caught) compared to the salted fish (12 flies caught). Dry prawn and mango failed to catch any fly, thus, they were not suitable baits in trapping flies. Omar et al. (2003b) found larger numbers of species attracted to prawn or beef liver compared to mix fruits (mango and banana) and only 13 flies out of 5479 flies were captured from mix fruits. From our study, it indicated that *C. megacephala* was the most dominant species (72.55%), followed by *M. domestica* (11.76%), *Sarcophaga* spp.(9.80%) and the least was *L. cuprina* (5.88%). The blowfly *C. megacephala* was the most dominant species in Titiwangsa Range near Kuala Lumpur in Gombak, Selangor and dumping ground in Kuala Lumpur respectively (Omar et al. 2003b). Studies in Putrajaya also indicated that *C. megacephala* (67.80%) was the most dominant species followed by *Sarcophaga* spp. (12.97%) and *Musca domestica* (3.46%) (Nazni et al. 2007).

C. megacephala was the dominant species of flies collected and this might be due to its synanthropic behavior (Omar et al. 2003b). Its preference to congregate towards source of protein was observed by Sucharit et al. (1971). The distribution of this fly is associated with the expansion of human movement and settlement (Wells 1991). This fly has adapted very well with human environment that they can be found at almost every corner of earth wherever human flourish. *C. megacephala* was also discovered at Genting Highland but the number was small (Omar et al. 2003b). Kurahashi et al. (1997) reported the presence of this fly at primary forest (Kuala Tahan and Gunung Brinchang, Pahang), secondary forest (Ulu Langat, Selangor), rural villages (Ranau, Sabah; Subuyau, Sarawak) and towns (Kuala Lumpur; Bukit Fraser, Pahang). In our study, Bukit Pelindung is one of the highest lands in Kuantan area, and *C. megacephala* still can be seen and abundant if compared to other species. According to Kurahashi (1987), this fly can be observed for all months of the year and at elevations from sea level to 2000 m. *C. megacephala* was the most dominant flies in Teluk Cempedak, because there were more human activities compared to the other places. *C. megacephala* were more attracted to pork, indicated that decaying animal matter was the suitable bait in trapping this fly.

Only *C. megacephala* and Sarcophagid can be seen in all three habitats. *M. domestica* was absent in Agricultural Park and *L. cuprina* was absent in Bukit Pelindung. Omar et al. (2003b) noted that *L. cuprina* only found in Kolej Tun Syed Nasir (KTSN) in Kuala Lumpur (residential complex for Universiti Kebangsaan Malaysia) which is 30 meters above the sea level and Kg. Sg. Pusu (100 meters above the sea level) (Omar et al. 2003a). This indicated that *L. cuprina* is probably a low land species.

Musca domestica, which is hemisynanthropic behavior (Omar et al. 2003b) was caught in higher numbers in Teluk Cempedak beach compared to the other two habitats. It was due to the higher numbers in human activities at the beach as there was a famous tourist attraction destination. This domestic fly is widely spread all over the world and can be found at fisheries, slaughter houses, vegetable farms, market places, garbage disposal sites and poultry farms (Cheong et al. 1970; Sucharit et al. 1971; Sulaiman et al. 1988).

To determine the fly diversity accurately in a particular location is depend to the proper flies collection techniques, proper baits, and suitable ecology. In this study, hand net was used to collect fly, but this method was not efficient compared to a proper flytrap. Longer exposure period was suggested to attract more flies came to the baits (exp. >24 hours). Baits should be variety and different in its status (fresh or decay). Placing baits in a suitable ecology habitat was necessary in trapping flies of behavioral differences. Synantrophy index of fly should be considered in placing baits and flytrap to minimize the chance of synantropic overlapping.

This paper has highlighted that Calliphoridae (*C. megacephala* and *L. cuprina*), Muscidae (*M. domestica*) and Sarcophagidae were found in Kuantan area and this knowledge of fly distribution can be utilized in the application of forensic entomology in solving crime. Other species of flies also have been sighted such as *C. rufifacies* and *Ophyra* spp. in recreational park and Taman Teruntum, Kuantan. Therefore, more study site should be investigated for flies' diversities in Kuantan areas to obtain more accurate data.

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NOTA KEPADA PENGARANG

Jurnal Sains Kesihatan Malaysia menerbitkan naskhah asal dalam Bahasa Melayu dan Inggeris meliputi pelbagai bidang sains perubatan dan kesihatan seperti audiologi, biokimia, pergigian, dietetik, pengimejan perubatan, sinaran perubatan, pemakanan, optometri, farmakologi, farmasi, fisiologi, fisioterapi, terapi carakerja, sains forensik, kesihatan masyarakat, psikologi kesihatan, kesihatan persekitaran, sains pertuturan dan sains sukan. Jurnal ini menjadi suatu arena untuk menyebarkan penemuan terbaru dalam penyelidikan dan pembangunan sains perubatan dan kesihatan, termasuk kaedah dan hasilan penyelidikan yang membawa kepada penemuan bahan biologi aktif, pembangunan teknik baru, laporan kes, kegunaan klinikal dadah, teknik pengesanan penyakit dan rawatan, farmaseutikal dan hasilan semulajadi. *Komunikasi ringkas* dan *artikel ulasan* juga akan diterima untuk diterbitkan dalam jurnal ini.

Komunikasi ringkas yang menerangkan penemuan asli dan memerlukan penerbitan segera akan juga dipertimbangkan penerbitannya di dalam jurnal ini. Komunikasi ringkas perlu dihadkan kepada enam muka surat bertaip sahaja termasuk jadual, ilustrasi dan rujukan. Jadual dan ilustrasi perlulah dalam bilangan yang minimum. Setiap komunikasi ringkas perlu dimulakan dengan pengenalan ringkas. Naskhah komunikasi ringkas tidak perlu dipecahkan kepada bahagian seperti mana kertas penuh, walau bagaimanapun susunan perenggan boleh mengikut pertimbangan pengarang sendiri. Prosedur penyuntingan dan penerbitan akan dipercepatkan untuk menyegerakan penerbitan. Umumnya, naskhah komunikasi ringkas akan sama ada diterima atau ditolak. Naskhah komunikasi ringkas yang memerlukan pembedaan *major* berdasarkan kepada komen pengadil tidak akan diterima.

Artikel ulasan adalah komentar atau huraian yang mengandungi penjelasan, kritik atau pendapat mengenai sesuatu perkara dan ditulis tidak melebihi lima belas muka surat. Artikel ulasan juga akan diadili dan proses penerbitannya juga akan dipercepatkan.

PENYERAHAN NASKHAH ASAL

Semua naskhah asal perlu disertakan dengan suatu pernyataan yang jelas bahawa kerja yang dilakukan tidak pernah diterbitkan di dalam mana-mana penerbitan dan tidak berada di bawah penilaian mana-mana jurnal lain. Jika terdapat lebih daripada seorang pengarang, suatu pernyataan yang jelas perlu dibuat di dalam surat penyerahan bahawa SEMUA pengarang bersama telah bersetuju dalam penyerahan naskhah asal tersebut. Borang persetujuan yang ditandatangani oleh semua pengarang hendaklah diserahkan bersama-sama dengan naskhah asal yang dihantar. Pengarang perlu menyimpan salinan kepada semua bahan

yang diserahkan. Naskah asal tidak akan dikembalikan dan salinan asal kepada kerja grafik hanya akan dikembalikan jika dinyatakan secara spesifik pada ilustrasi tersebut. Untuk membantu memastikan bahawa kertas akan dinilai oleh penilai yang bersesuaian, pengarang boleh mencadangkan nama dua orang pengadil (berserta alamat, faks dan alamat mel elektronik) yang tidak terlibat secara langsung dengan kerja penyelidikan yang diserahkan. Para penyunting mempunyai hak untuk memilih pengadil selain daripada yang dicadangkan.

Tiga salinan naskah asal berserta jadual dan ilustrasi perlu diserahkan kepada Ketua Penyunting Jurnal Sains Kesihatan Malaysia:

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ORGANISASI NASKHAH ASAL

Semua naskah asal perlu ditaip dengan kemas, bersih dan selaras pada sebelah halaman sahaja (sebelah halaman lagi mesti dikosongkan) menggunakan kertas yang bermutu ukuran A4 putih. Naskah asal hendaklah diberi bilangan berturutan dengan menggunakan angka Arab sahaja, dari halaman pertama hingga halaman terakhir. Naskah asal (termasuk tajuk jadual, tajuk ilustrasi dan rujukan) hendaklah ditaip langkau dua baris (*double spacing*) serta ruang tepi yang memadai berukuran masing-masing dari sebelah kiri, atas, kanan dan bawah : 1.5 in. (40 mm), 1 in. (25 mm), 1.25 in. (30 mm) dan 1.25 in. (30 mm). Satu set ilustrasi asal perlu diserahkan dan sedia untuk dihantar kepada pencetak. Salinan ilustrasi lukisan garis boleh berupa pendua kepada yang asal tetapi bagi salinan ilustrasi gambar foto, pengarang perlu menyediakan gambar foto bukan pendua (fotokopi).

CAKERA PADAT

Naskah asal yang telah diterima dan telah dibuat pembetulan, perlu disediakan juga dalam bentuk cakera padat (digalakkan menggunakan Microsoft Words untuk keseluruhan teks dan senarai tajuk jadual dan ilustrasi). Pengarang hendaklah memastikan bahawa fail telah dikemaskini dengan memasukkan kesemua pembetulan berdasarkan kepada saranan pengadil. Versi di dalam cakera padat perlulah sama dengan salinan keras. Cakera padat yang dihantar perlu

diiringi dengan surat yang menyatakan nombor rujukan naskhah asal, dan program perisian yang digunakan.

MUKA SURAT TAJUK

Muka surat tajuk perlu mengandungi perkara berikut mengikut tertib : TAJUK – Tajuk penuh dan tajuk kecil tidak boleh melebihi 50 ruang huruf. NAMA PENGARANG – Nama pertama dan nama keluarga bagi setiap pengarang, AFILIASI – nama dan alamat penuh pengarang dan pengarang bersama serta alamat mel elektronik, nombor telefon dan faks bagi responden yang akan berurusan dengan ketua penyunting. Alamat dipadankan dengan pengarang dengan meletakkan superskrip bernombor pada nama pengarang dan alamat. ABSTRAK/ABSTRACT AND KATA KUNCI/KEYWORDS – Abstrak (300 perkataan maksimum) dalam Bahasa Melayu dan Inggeris yang menggambarkan kajian dan hasil kajian secara keseluruhannya perlu disediakan (Para penyunting akan menyediakan abstrak dalam Bahasa Melayu bagi pengarang yang tidak fasih berbahasa Melayu) serta perlu disediakan juga tiga hingga lima kata kunci.

TEKS UTAMA

Teks utama naskhah asal tidak boleh melebihi 15 mukasurat bertaip dan dipecahkan kepada bahagian seperti berikut: PENDAHULUAN – Mengandungi maklumat mengenai latar belakang, kepentingan dan objektif kajian tanpa mengulangi apa yang telah dinyatakan di dalam abstrak atau menyimpulkan keputusan kajian. BAHAN DAN KAEDAH – Nyatakan kaedah kajian dengan terperinci dan bahan yang digunakan termasuk bilangan subjek. Nyatakan juga kaedah analisis data yang digunakan. Bagi kajian ke atas manusia, nyatakan dalam perenggan pertama sama ada kelulusan etika penyelidikan dan persetujuan menyertai kajian oleh subjek telah diperolehi atau tidak. KEPUTUSAN – Keputusan kajian perlu dipersembahkan dalam urutan yang jelas dan logik. PERBINCANGAN – Beri penekanan dalam aspek peningkatan keilmuan yang diperolehi daripada kajian. KESIMPULAN – Simpulkan keputusan dan hasil utama yang diperolehi. Bahagian PENGHARGAAN dan RUJUKAN seharusnya mengikuti teks utama manakala TAJUK JADUAL ILUSTRASI ditaip di atas mukasurat berasingan. Penggunaan nota kaki adalah tidak digalakkan. Kemunculan jadual dan ilustrasi mengikut urutan di dalam teks utama perlu dinyatakan dengan jelas di dalam teks.

RUJUKAN

Penerbit UKM menggalakkan pengarang menggunakan sistem pengarang-tarikh dalam menyediakan dokumentasi sumber. Rujukan kepada jurnal, artikel, buku, bab dalam buku, monograf atau mana-mana penerbitan lain di dalam teks perlu mengandungi nama pengarang diikuti dengan tahun penerbitan tanpa

penggunaan tanda baca di antara nama dan tarikh misalnya, (Ismail 1997) atau Ismail (1997). Untuk rujukan berbilang pengarang, gunakan hanya dua atau tiga pengarang misalnya, (Kamal Roslan dan Che Aziz 1996) atau (Mohd. Ghazali, Zawiyah dan Rosnah 1992). Perkataan 'dan' boleh digantikan dengan *ampersand* '&'. Rujukan lebih daripada tiga pengarang, gunakan nama yang pertama disusuli dengan et al. Misalnya, (Dahlan et al. 1997). Dalam senarai rujukan, rujukan disusun mengikut abjad. Rujukan perlu disingkatkan menggunakan gaya yang digunakan di dalam *Index Medicus* atau *the World List of Scientific Periodicals*, Edisi Ke 4. Hasil penulisan yang tidak diterbitkan atau penulisan peribadi tidak boleh disenaraikan tetapi boleh dinyatakan di dalam teks. Hasil penulisan yang telah diterima untuk penerbitan tetapi belum diterbitkan boleh juga disenaraikan tetapi dinyatakan sebagai "Akan diterbitkan." Pengarang adalah bertanggungjawab untuk memastikan setiap rujukan ditulis dengan betul dan mendapat kebenaran daripada pengarang berkenaan untuk rujukan yang belum diterbitkan

Dalam senarai rujukan, untuk jurnal atau terbitan berkala, maklumat yang dinyatakan adalah nama pengarang (dan pengarang bersama), tahun diterbitkan, judul rencana, judul jurnal/terbitan berkala (dihuruf condongkan), jilid/bilangan keluaran dan halaman rencana misalnya,

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Puybasset, L., Giudicelli, J. F. and Berdeaux, A. 1997. Coronary effects of exogenous and endogenous bradykinin in conscious dogs. *Fundam. Clin. Pharmacol.* 11 : 322 – 330.

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Untuk kertas kerja/Pasca Sidang, penulisan rujukan adalah seperti berikut;

Friston, K. J. 2004. *Experimental Design and Statistical Parametric Mapping*. Dlm. *Human Brain Function* (Edisi kedua), disunting oleh R. S. J. Frackowiak, K. J. Friston, C. D. Frith, R. J. Dolan, C. J. Price, S. Zeki, J. Ashburner dan W. D. Penny. Amsterdam : Elsevier Academic Press.

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