

DERMAL MYIASIS CAUSED BY THE FLESH FLY, *PARASARCOPHAGA (LIOSARCOPHAGA) DUX* (THOMSON, 1869) (DIPTERA: SARCOPHAGIDAE) AT THE SITE OF A MALIGNANT MELANOMA: A CASE REPORT

Siri Chiewchanvit¹, Udom Chaithong², Sangob Sanit², Chutharat Samerjai² and Kabkaew L Sukontason²

¹Department of Internal Medicine, ² Department of Parasitology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

Abstract. Dermal myiasis due to the flesh fly has not been commonly reported in Thailand. A 64-year-old man came to the hospital with a 6-month history of a black tumor on the dorsum of the right great toe. The tumor was biopsied and determined to be a malignant melanoma. Second instar larvae were also seen in the wound and one larva was reared until the adult stage wherein it was identified as the flesh fly, *Parasarcophaga (Liosarcophaga) dux* (Thomson, 1869) (Diptera: Sarcophagidae). This case shows myiasis due to synanthropic sarcophagid flies occurs in Thailand and can occur in a malignant melanoma.

Keywords: *Parasarcophaga dux*, myiasis, melanoma, Thailand

INTRODUCTION

Flesh flies (Diptera: Sarcophagidae) are of medical importance worldwide. Some species exist in the same environments inhabited by humans, and can cause myiasis (Zump, 1965). Myiasis is infestation of humans or other vertebrates with dipterous larvae that feed on tissue or body fluids (Zumpt, 1965). As of 1965, about 15 species of *Sarcophaga* had been reported to cause myiasis (Zumpt, 1965). Species of sarcophagids reported to infest humans include: *Sarcophaga argyrostoma*

(Robineau-Desvoidy, 1830) (Burgess and Spraggs, 1992), *Sarcophaga crassipalpis* Macquart, 1839 (Morris, 1987), *Boettcherisca peregrina* (Robineau-Desvoidy, 1830) (Miura *et al*, 2005), *Wohlfahrtia magnifica* (Schiner 1862) (Droma *et al*, 2007), and *Bercaea africa* (Wiedemann, 1824) (= *Sarcophaga haemorrhoidalis*) (Braverman *et al*, 1994; Abdel-Hafeez *et al*, 2015).

A total of 83 species from 29 genera of flesh flies have been reported in Thailand (Kurahashi and Chaiwong, 2013). Bänziger and Pape (2004) reported female *P. dux* larviposits on both feces and carrion, suggesting an increased chance of human involvement in urban habitats. A fly fauna survey found this species has synanthropy with humans (Chaiwong *et al*, 2014). This close association increased the risk of human myiasis.

In Thailand, the paucity of published

Correspondence: Dr Kabkaew L Sukontason, Department of Parasitology, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand.

Tel: +66 (0) 53 935342 ext 502; Fax: + 66 (0) 53 935347

E-mail: kabkaew.s@cmu.ac.th



Fig 1–Malignant melanoma on the right great toe of the patient.

data on myiasis caused by the sarcophagid fly in humans is probably due to difficulty in identifying fly species in larval and adult stages, and lack of awareness among healthcare practitioners. In 1981, the first reported case of human myiasis in Thailand caused by *Liopygia ruficornis* (Fabricius, 1794) was in the vagina (Sucharit *et al*, 1981), the second case of human myiasis in Thailand was caused by *P. dux* was in the ear (Chaiwong *et al*, 2014). This study reports a case of myiasis in Thailand caused by *P. dux* found in excised malignant melanoma.

CASE REPORT

A 64-year-old male, retired government employee presented to the hospital with a black mass on the dorsum of a right great toe which has been presented for 6 months. He took long term warfarin, tritace and digoxin for dilated cardiomyopathy and atrial fibrillation. Six months ago, he went to a community hospital where the nail extraction was performed. One month

later, he came to the surgical department of our hospital because of the wound infection. Black necrotic tissue with pus was noticed. Debridement and curettage was performed with gross bleeding and the antibiotics (intravenous ceftriaxone 2 g/d and oral augmentin) were prescribed because of the wound inflammation and the presence of pus. The pus culture grew *Enterococcus faecalis* and *Staphylococcus aureus*. He was referred

back to the community hospital for wound care and dressing. The infection was controlled when he came back to the surgical department 1 month later. Dark color granulation tissue with necrotic tissue was noted. The surgeon consulted a cardiologist to stop the anticoagulant. Then, the patient lost to follow-up. He came back to the dermatology unit 4 months later because of the non-healing ulcer with bloody discharge. Examination of the right big toe showed an irregular 3-cm black mass with superficial erosion, contact bleeding and crust at the dorsum of distal phalanx (Fig 1). No nail plate was found. Fly larvae (maggot) were also seen creeping in the mass and were removed with forceps. Ten days later, the pathological examination reported malignant melanoma that was found negative to BRAF V6000E mutation. The toe amputation and right groin nodes dissection were performed. The groin nodes, 4/12 nodes, were positive for metastatic melanoma with perinodal soft tissue invasion. CT chest and abdomen was negative. He has been treated by the

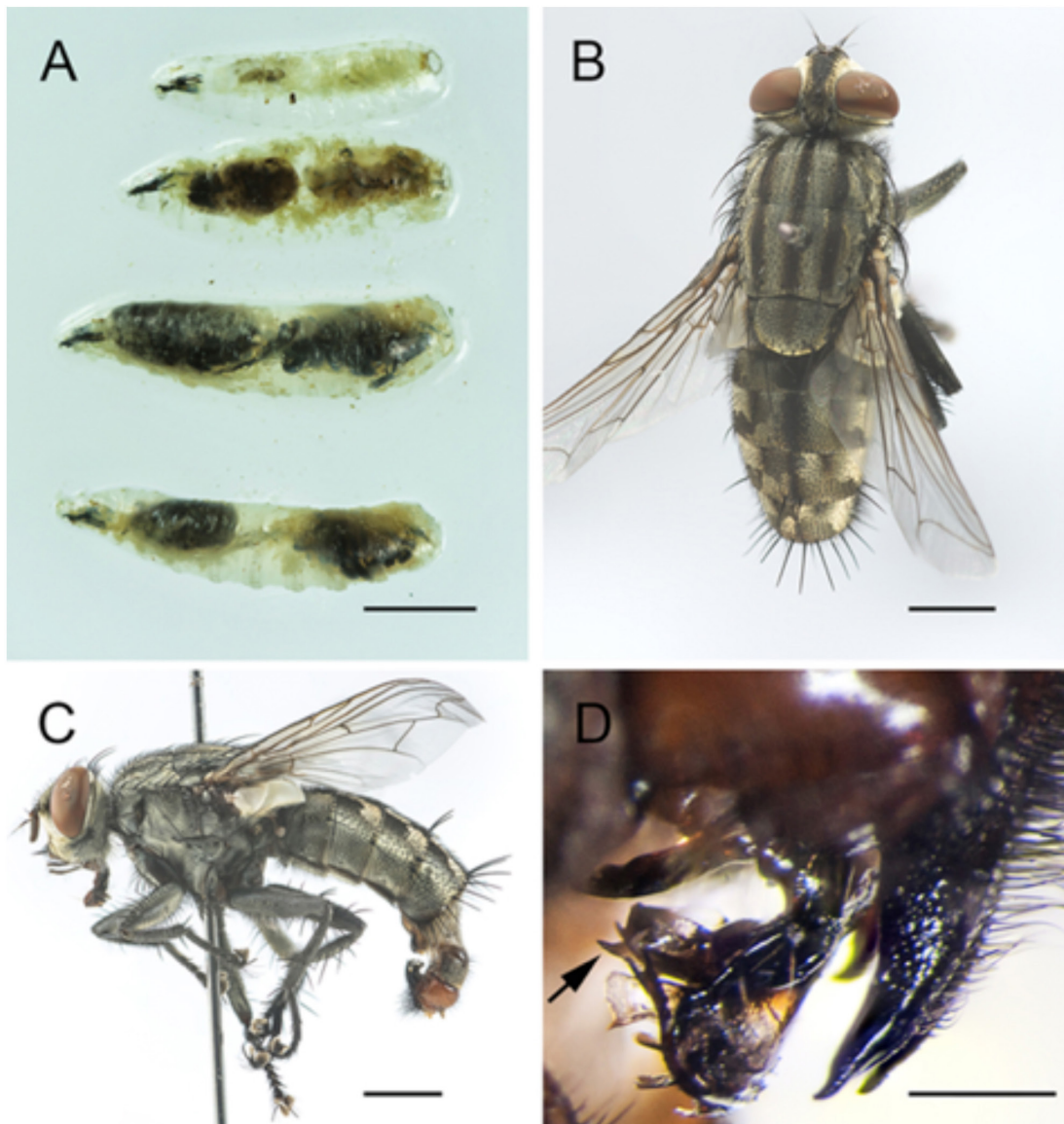


Fig 2—*Parasarcophaga dux*. A) second instar larvae removed from the patient, Bar = 2 mm. B) male fly that emerged from a reared larva, dorsal view, Bar = 2 mm. C) male fly that emerged from a reared larva, lateral view, Bar = 2 mm. D) Male genitalia showing the apically bifurcated juxta (arrow), Bar = 3 mm.

radiologist and oncologist. The patient is still alive 6 months after the diagnosis of malignant melanoma.

Entomological examination of the fly larvae was performed. The larvae were white, fusiform in shape with a

stout body. They had a posterior spiracle within a deep cavity, suggesting they were the larvae of the flesh fly (Fig 2A). Four specimens were collected and put in 70% ethanol; 3 live second instar larvae were reared to adulthood for morphological

identification. A key for flesh flies in Thailand (Kurahashi and Chaiwong 2013) was used to identify the adult flies as *Parasarcophaga dux* on the basis of its body and genitalia (Fig 2B, 2C). Examination of the male fly genitalia revealed prominence of apically bifurcated juxta (Fig 2D).

DISCUSSION

Human myiasis caused by *Parasarcophaga dux* is rare (James, 1947). This could be the first report of myiasis caused by *P. dux* in a human occurring in a malignant melanoma. Poor personal hygiene can allow female *P. dux* larviposit. Investigation of this fly in the laboratory revealed one female larviposits ~20-40 larvae (Sukontason KL, unpublished data). To the best of the authors' knowledge, this is the second reported case of *P. dux* myiasis among humans in Thailand and the first reported dermal infestation. As mentioned previously, the first case was *P. dux* causing aural myiasis; this was a case from Ubon Ratchathani Province, Thailand (Chaiwong *et al*, 2014). In a recently published review, only three cases of human myiasis caused by flesh flies have been documented, including this case in Thailand. According to Pape (1996), *P. dux* has wide distribution, found in: Palaearctic, Afrotropical, Oriental, and Australasian/Oceanian regions. In Thailand, this species exists in a variety of habitats: urban, suburban, beach and mountains up to 1,300 m elevation, suggesting its adaptability (Kurahashi and Chaiwong, 2013).

The diagnosis of the subungual melanoma in this case is difficult. Malignant melanoma in Thailand is very rare. Clinical manifestations of subungual hematoma and melanoma are almost the same. Because of the history, bleeding tendency

from the anticoagulant, similarity of the clinical manifestations and the incidence of the disease can cause a missed diagnosis, even by a dermatologist.

Knowledge of *P. dux* biology helps us understand how humans can become accidental hosts (Bänziger and Pape, 2004). The overlap between human and *P. dux* habitats means humans are at risk for myiasis due to this species.

ACKNOWLEDGEMENTS

This study was supported by the Excellence Center in Insect Vector Study, and a Diamond Research Grant from the Faculty of Medicine, Chiang Mai University, Thailand. The authors are grateful to the Chiang Mai University for defraying the publication cost.

REFERENCES

- Abdel-Hafeez EH, Mohamed RM, Belal US, Atiya AM, Takamoto M, Aosai F. Human wound myiasis caused by *Phormia regina* and *Sarcophaga haemorrhoidalis* in Minia Governorate, Egypt. *Parasitol Res* 2015; 114: 3703-9.
- Bänziger H, Pape T. Flowers, faeces and cadavers: natural feeding and laying habitats of flesh flies in Thailand (Diptera: Sarcophagidae, *Sarcophaga* spp.). *J Nat His* 2004; 38: 1677-94.
- Braverman I, Dano I, Saah D, Gapany B. Aural myiasis caused by flesh fly larva, *Sarcophaga haemorrhoidalis*. *J Otolaryngol* 1994; 23: 204-5.
- Burgess I, Spraggs PDR. Myiasis due to *Parasarcophaga argyrostoma*-first recorded case in Britain. *Clin Exp Dermatol* 1992; 17: 261-3.
- Chaiwong T, Limpavithayakul M, Tem-Eiam N, Boongunha N, Poolpol W, Sukontason KL. Aural myiasis caused by *Parasarcophaga (Liosarcophaga) dux* (Thomson) in Thailand. *Trop Biomed* 2014; 31: 496-8.

- Droma EB, Wilamowski A, Schnur H, Yarom N, Scheuer E, Schwartz E. Oral myiasis: a case report and literature review. *Oral Surg Oral Med Oral Pathol Radiol Endod* 2007; 103: 92-6.
- James MT. The flies that cause myiasis in man. Washington: United States Department of Agriculture, 1947.
- Kurahashi H, Chaiwong T. Keys to the flesh flies of Thailand, with description of a new species of *Robineauella* Enderlein (Diptera: Sarcophagidae). *Med Entomol Zool* 2013; 64: 83-101.
- Miura M, Hayasaka S, Yamada T, Hayasaka Y, Kamimura K. Ophthalmomyiasis caused by larvae of *Boettcherisca peregrina*. *Jpn J Ophthalmol* 2005; 49: 177-9.
- Morris B. First reported case of human aural myiasis caused by the flesh fly *Parasarcophaga crassipalpis*. *J Parasitol* 1987; 73: 1068-9.
- Pape T. Catalogue of the sarcophagidae of the world (Insecta: Diptera). Gainesville: Associated Publishers, 1996.
- Sucharit S, Kerdpibule V, Tumrasvin W, et al. Myiasis of the vagina of a comatose women caused by *Parasarcophaga ruficornis* Fabricius. *J Med Assoc Thai* 1981; 64: 580-3.
- Zumpt F. Myiasis in man and animals in the old world. London: Butterworths, 1965.