

Short Communication

Orbital ophthalmomyiasis caused by *Chrysomya bezziana* in Thailand

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Received 2 August 2017; received in revised form 5 October 2017; accepted 6 October 2017

Abstract. Orbital ophthalmomyiasis occurs infrequently in Thailand. Herein, we report a case in Chiang Mai, Thailand, of orbital ophthalmomyiasis due to larvae of the blow fly *Chrysomya bezziana* (Diptera: Calliphoridae). A 94-year-old woman was admitted to Maharaj Nakorn Chiang Mai Hospital, Chiang Mai, Thailand, with a swollen and ulcerated right upper eyelid. The lesion in the eyelid had multiple holes around the ulcer site; bleeding was accompanied by pus and necrotic tissue – the site was filled with dipteran larvae. Eleven larvae were removed from the patient, of which five were killed for microscopic examination and six were reared in the laboratory under ambient temperature and natural relative humidity until they metamorphose into adult. Five third instars and one adult were morphologically identified as *C. bezziana*. The predisposing factors were probably chronic immobility, inability of the patient to perform daily activities, and presumably neglected and/or poor personal hygiene. To our knowledge, this case represents the first reported case of orbital ophthalmomyiasis caused by *C. bezziana* in Thailand.

Myiasis is an infestation by dipterous larvae in humans or other vertebrates; they, at least for a certain period, feed on the host's dead or living tissues, liquid body substances, or ingested food (Zumpt, 1965). In Thailand, many groups of flies cause myiasis, including: blow flies (Diptera: Calliphoridae), such as *Chrysomya bezziana* (Papasarathorn & Piyarasana, 1962; Papasarathorn *et al.*, 1967; Koranantakul *et al.*, 1991; Nacapunchai & Laohavichit, 1999; Sukontason *et al.*, 2006), *Chrysomya megacephala*, and *Chrysomya rufifacies* (Sukontason *et al.*, 2005); flesh flies (Diptera: Sarcophagidae), such as *Liopygia ruficornis* (Sucharit *et al.*, 1981) and *Parasarcophaga dux* (Chaiwong *et al.*, 2014); *Oestrus ovis* (Diptera: Oestridae) (Nacapunchai *et al.*, 1998); *Dermatobia hominis* (Diptera: Cuterebridae) (Thanapatcharoen *et al.*, 2012); *Eristalis tenax*

(Diptera: Syrphidae) (Siripoonya *et al.*, 1993); and *Megaselia scalaris* (Diptera: Phoridae) (Solgi *et al.*, 2017). Although many cases of myiasis have been reported in Thailand, ophthalmomyiasis is uncommon, with only one case previously reported – a case of external ophthalmomyiasis caused by *O. ovis* (Nacapunchai *et al.*, 1998). We present a case of orbital myiasis for the first time in Thailand caused by *C. bezziana* in an adult patient from the northern part of country.

CASE HISTORY AND ENTOMOLOGICAL FINDING

In 2014, a 94-year-old female patient was referred to Chiang Mai University Hospital. She was confused and bedridden, so her history was taken from her relatives. She



Figure 1. Orbital myiasis infested with larvae of *C. bezziana* at the right eye of the patient.

had a long history of right eyelid swollen, itching, and ulcerated. Two weeks prior to admission, multiple holes were noticed around the ulcer sites with contact bleeding. Three days later, pus and worms came out of the ulcerated wound. She went to see a doctor at a district hospital, who removed many worms from her eyelids, and then referred her to our hospital. Visual acuity was not evaluated, as the patient was non-cooperative. The eye examination showed swelling of the right eyelid, with erythema and crepitation and a large deep ulceration at the periorbital area (Fig. 1). The ulcer was filled with pus, necrotic tissue and maggots. The cornea was totally haze, while the globe was tense by palpation. CT imaging of the orbit showed an intact eye wall. The patient underwent emergency surgery to debride the periorbital wound, remove the maggots and enucleate the eyeball. White “larvae” were seen at the eye. Eleven larvae were removed from the patient’s eye and placed in a small plastic container; they were sent to the Department of Parasitology, Faculty of Medicine, Chiang Mai University for identification. Two weeks after surgery the wound was clean; no pus, bleeding or worms were found.

At the Department of Parasitology, macroscopic examination of the larvae revealed worm-like bodies of fully-grown third instars, each measuring approximately 13 mm in length. They had smooth, broad bodies, with cuticular spines along the body segment. Five larvae were killed for microscopic examination by transferring them to a beaker containing hot water (90°C) for three minutes. Each larva was cut using a sharp blade at two sites: 1) across the 2nd thoracic segment to view the cephaloskeleton, anterior spiracle and cuticular spines between the 1st and 2nd thoracic segments and 2) across the middle of the 8th abdominal segment to view the posterior spiracle. The anterior and posterior parts were placed on a glass slide, covered with a cover slip and examined under a light microscope (Olympus, Japan). Examination was focused on the characteristics of the cephaloskeleton, anterior spiracle with 5 papillae and a posterior spiracle (Fig. 2A). The cuticular spines between the 1st and 2nd thoracic segments were thorn-like black spines with single teeth. All these characteristics were the unique of *C. bezziana*, the Old World screwworm fly (Spradbery, 2002). The remaining six larvae were reared to adulthood in the laboratory under ambient temperature (~28°C) and relative humidity (~69%). All third instar were pupated and all puparia were kept in a plastic box and put in a cage. On day 6 of pupation, one adult fly emerged. *C. bezziana* was confirmed by morphological identification of the adult that emerged from one puparium. The morphological characteristics of the adult were as follows: metallic green in color, with the parafacial and gena a yellowish-orange, and covered with fine yellow-white hair; the lower calypter was white to yellowish-white; the third antennal segment was entirely orange; and the anterior half of the upper calypter was whitish and covered with white hair dorsally (Fig. 2B).

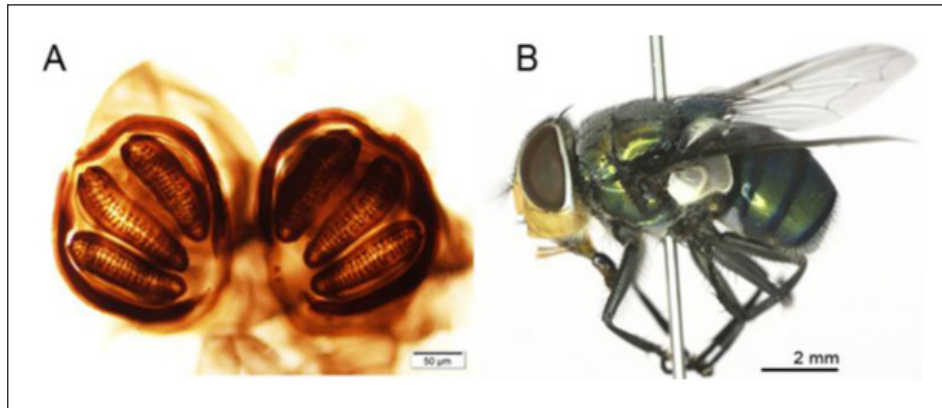


Figure 2. Light micrographs of *C. bezziana*. (A) Posterior spiracle of third instar. (B) Adult that emerged from a puparium reared in the laboratory.

DISCUSSION

Although *C. bezziana* has been reported as myiasis-producing agent, to the best of our knowledge, this case reports the first ophthalmomyiasis caused by this fly species in Thailand. *C. bezziana*, native to the Old World, is an obligate parasite that requires a living host (Hall and Wall, 1995). It has been reported as a myiasis-producing agent worldwide, including in Sri Lanka (Kumarasinghe *et al.*, 2000), Hong Kong (Chan *et al.*, 2005; Lam and Lui, 2014), Malaysia (Lee *et al.*, 2005), India (Fotedar *et al.*, 1991; Sankari and Ramakrishnan, 2010), Iran (Faramarzi *et al.*, 2009; Soleimani-Ahmadi *et al.*, 2013), and Mexico (Romero-Cabello *et al.*, 2010). In Thailand, the first confirmed report of myiasis caused by *C. bezziana* was a from the tumor mass of the left mastoid (Papasarathorn and Piyarasana, 1962).

Ophthalmomyiasis is an infestation of any anatomic structure of the eye. It is subclassified into three categories – ophthalmomyiasis externa (or superficial), ophthalmomyiasis interna or orbital myiasis, according to the site and degree of larval infestation (Francesconi and Lupi, 2012). External ophthalmomyiasis is a limited infestation of the superficial periocular tissues, and includes palpebral and conjunctival myiasis; internal ophthalmomyiasis occurs when parasitic dipterous larvae penetrate the conjunctiva and sclera

and migrate into the subretinal space. Orbital myiasis is the least common form, with few reports worldwide (Kersten *et al.*, 1986; Çaça *et al.*, 2003).

Orbital myiasis can be caused by an infestation of any of several fly species, including *Hypoderma bovis* (Çaça *et al.*, 2003), *Lucilia sericata* (Kalakoti *et al.*, 2013), *Cochliomyia hominivorax* (Osorio *et al.*, 2006; Enríquez *et al.*, 2016), *Cochliomyia* sp. (Balasubramanya *et al.*, 2003), and *O. ovis* (Kaeley *et al.*, 2017). Orbital myiasis cases due to *C. bezziana* have also been documented from Saudi Arabia, where the larvae invaded the orbital apex (Kersten *et al.*, 1986); Hong Kong, where the orbital myiasis complicated squamous cell carcinoma of the eyelid (Yeung *et al.*, 2010); and Iran, where the larvae infested ocular and orbital tissues, progressed rapidly and completely destroyed the orbital tissues within days, especially in patients with poor general health (Khataminia *et al.*, 2011). According to Kalamkar *et al.* (2016), orbital myiasis is uncommon in clinical practice and seen in patients with poor hygiene and a debilitated or with compromised immune system. In our patient's case, the chronic immobility and presumably neglected created an attractive site – the eyes – for *C. bezziana* to oviposit. This study has identified *C. bezziana* as a clinically important fly species contributing to the occurrence of ophthalmomyiasis in Thailand.

Acknowledgments. We thank the Faculty of Medicine, Chiang Mai University for their support through a “Diamond Research Grant”.

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