Two *Sarcophaga* wound myiases in Japan: *S. peregrina* at a trichophytosis sore of an inpatient and *S. crassipalpis* in a post-surgical wound of a home convalescent

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Abstract: Two cases of *Sarcophaga* myiasis were found in Osaka Prefecture, Japan. In the first case, larvae were removed from a trichophytosis sore at the root of the toes on the right foot of a 77-yr-old woman confined to bed in a hospital and were reared in our laboratory. The adult flies which emerged were identified as *S. peregrina* Robineau-Desvoidy on the basis of the characteristics of adult flies. This indicates a hospital-acquired myiasis. In the second case, one larva was removed from a post-surgical wound in the face of a 72-yr-old man convalescing in his home after resection of genyantrum cancer and was reared in the laboratory; the one adult fly which emerged was identified as *S. crassipalpis* Macquart. The definition of myiasis is discussed and clinical characteristics of patients with wound myiases in Japan are summarized.

Key words: genyantrum cancer, hospital-acquired myiasis, *Sarcophaga crassipalpis*, *S. peregrina*, trichophytosis sore, wound myiasis

INTRODUCTION

Human cases of facultative myiasis caused by members of the family Sarcophagidae (Diptera) have been found throughout the world (James, 1947; Zumpt, 1965; Lee, 1968; Norris, 1989; Hall and Wall, 1995; Sherman, 2000). *Sarcophaga peregrina* has been thought to cause intestinal myiasis and traumatic myiasis in humans (Zumpt, 1965) and is distributed throughout Japan (Ishijima, 1967). Chigusa et al. (1994) listed 13 cases of myiasis caused by *S. peregrina* found in Japan: one nasal, one oral, two wound (Kani et al., 1981a, b; Kato et al., 1991), three intestinal, and six aural myiases. Yoneda et al. (1998) recorded a wound myiasis on the right wrist.

We present here as Case 1 a wound myiasis found on a trichophytosis sore between the toes on the right foot of a bedridden patient. This constitutes a hospital-acquired myiasis as recently reported in the United States, Australia, England, Europe, and Japan (Jacobson et al., 1980; Roche et al., 1990; Daniel et al., 1994; Chigusa et al., 1996; Yoneda et al., 1998; Uni et al., 1999).

*Sarcophaga crassipalpis* is distributed in large urban areas of Japan (Ishijima, 1967). Reports of five cases of myiasis caused by *S. crassipalpis* have been published in
Japan: one wound myiasis (Kinebuchi and Ikemura, 1972), one ophthalmomyiasis (Uni et al., 1999), and three gastroenteric myiases (Yazaki et al., 1977; Nagakura et al., 1984, 1991; Shiota et al., 1990). In Australia, three myiases caused by S. crassipalpis have been reported: one aural myiasis (Morris, 1987) and two wound myiases from foot or ankle (Lukin, 1989); two wound myiases probably caused by S. crassipalpis have been reported in Canada and the United States (Ali-Khan and Ali-Khan, 1974; Magnarelli and Andreadis, 1981). We found a larva of S. crassipalpis, from a post-surgical wound in the face and classified this case as a wound myiasis rather than a nasopharyngeal myiasis; the rationale for this definition will be discussed.

Case Report 1. In the early morning of 5 June 2003, a nurse noticed white worms on a sore of trichophytosis at the root between the 1st and 2nd toes on the right foot of a 77-yr-old woman confined to bed in a hospital in Sakai City, Osaka Prefecture, Japan (Table 1; Fig. 1). The patient had suffered a subarachnoid apoplexy in January 2000 and had been paralyzed since that time. Windows of the hospital were unscreened.

Forty larvae (each 2 mm long) were removed from the patient. Five of them were put into saline and brought to the Department of Medical Zoology for identification on 6 June (Fig. 2). The larvae were reared at room temperature and fed on a piece of beef. On 9 June, the larvae had grown to 1.5 cm long; two larvae pupated on 12 June, and the other three larvae pupated on 13 June. The pupae, kept in plastic containers with pieces of moist tissue paper, were put in a cage of nylon mesh. On day 12 of pupation, two adult flies emerged, on day 13, two more, and one adult fly appeared on day 14 (Figs. 3 and 4). The three female and two male adult flies had characteristics of S. peregrina Robineau-Desvoidy specified by Kano et al. (1967) on the proplewan and posterior dorsocentral bristles. After removal of the larvae, the sore of the foot was treated with ointment for two weeks and the sore was healed.

Case Report 2. On 14 July 2000, one larva was removed from a post-surgical wound (Table 1; Fig. 5) in the face of a 72-yr-old man at the hospital of Osaka City University in Osaka, Japan. Resections of left genyantrum cancer had been done on 8 June and 11 November 1999; the area of the wound consisted of the left maxillary sinus, nasal cavity, and ethmoid sinus. Following discharge from the hospital on 20 May 2000, he was convalescing at his home in Osaka City, changing the gauze covering the wound every day. Feeling discomfort with pain and bleeding in the wound, the patient had the wound examined at the hospital.

The larva attached to the wound was 6.3 mm long and 2.5 mm wide and was reared at room temperature on mouse liver in the laboratory. On 19 July the larva had grown to 1.5 cm; it pupated on 24 July. The pupa was kept in an incubator at 23°C. On day 13 of pupation, one male fly emerged (Fig. 6). The fly had orange genital segments which were iden-

Fig. 1. Trichophytosis sore (arrow) on the right foot of a 77-yr-old patient just after removal of Sarcophaga peregrina larvae.
Fig. 2. Sarcophaga peregrina larva after removal.
Fig. 3. Sarcophaga peregrina male that emerged from a reared puparium. Actual size, 10 mm.
Fig. 4. Sarcophaga peregrina female that emerged from a reared puparium. Actual size, 11 mm.
Fig. 5. Wound (arrow) after removal of a Sarcophaga crassipalpis larva, following eight months after resection of genyantrum cancer in a 72-yr-old patient.
Fig. 6. Sarcophaga crassipalpis male that emerged from a reared puparium. Orange genital segment (arrow). Actual size, 10 mm.
Table 1. Clinical syndromes of six patients with the wound myiasis caused by *Sarcophaga peregrina* or *S. crassipalpis* in Japan.

<table>
<thead>
<tr>
<th>Species</th>
<th>Anatomic site(s)</th>
<th>Age, yrs.</th>
<th>Patient sex</th>
<th>Underlying illness</th>
<th>Location (City)</th>
<th>Hospital-acquired</th>
<th>Date</th>
<th>Number of larva(e)</th>
<th>Stage identified</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. peregrina</em></td>
<td>Retroauricular region</td>
<td>61*</td>
<td>M</td>
<td>Papillary adenocarcinoma</td>
<td>Nagoya</td>
<td>Yes</td>
<td>June, 1980</td>
<td>13</td>
<td>Adult</td>
<td>Kani et al. (1981a, b)</td>
</tr>
<tr>
<td><em>S. peregrina</em></td>
<td>Wrist</td>
<td>85</td>
<td>F</td>
<td>Spinaloma</td>
<td>Fukuoka</td>
<td>No</td>
<td>October, 1996</td>
<td>3</td>
<td>Larval</td>
<td>Yoneda et al. (1998)</td>
</tr>
<tr>
<td><em>S. peregrina</em></td>
<td>Foot</td>
<td>77*</td>
<td>F</td>
<td>Trichophytosis</td>
<td>Sakai</td>
<td>Yes</td>
<td>June, 2003</td>
<td>40</td>
<td>Adult</td>
<td>Present case 1</td>
</tr>
<tr>
<td><em>S. crassipalpis</em></td>
<td>Buttock and genitocrural region</td>
<td>54</td>
<td>M</td>
<td>Chronic pyoderma</td>
<td>Tokyo</td>
<td>Yes</td>
<td>June, 1971</td>
<td>24</td>
<td>Adult</td>
<td>Kinebuchi and Ikemura (1972)</td>
</tr>
<tr>
<td><em>S. crassipalpis</em></td>
<td>Maxillary sinus, nasal cavity, and ethmoid sinus</td>
<td>72</td>
<td>M</td>
<td>Genyantrum cancer</td>
<td>Osaka</td>
<td>No</td>
<td>July, 2000</td>
<td>1</td>
<td>Adult</td>
<td>Present case 2</td>
</tr>
</tbody>
</table>

* Patient with diminished consciousness.
tical to the characteristics of *S. crassipalpis* specified by Kano et al. (1967).

**DISCUSSION**

Zumpt (1965) pointed out that in a case of urogenital myiasis with preexisting wounds, a dermal or wound myiasis was diagnosed. As an external wound was found by Kani et al. (1981a, b), we have defined their case as a wound myiasis caused by *S. peregrina* rather than an aural. Similarly, we regard the case by Kato et al. (1991) as a wound myiasis in the perianal skin. Yoneda et al. (1998) reported four cases of myiasis caused by *S. peregrina* diagnosed in their laboratory: one urogenital myiasis (Case 9), one wound myiasis on the right wrist (Case 11), and two aural myiases. We did not include Case 9 among cases with a wound myiasis, because no preexisting wounds were recorded.

As shown in Table 1, in the cases of wound myiasis caused by *S. peregrina* the patients were elderly (range, 59–85 years; mean, 70.5 years). In the above-mentioned two cases by Kato et al. (1991) and Yoneda et al. (1998), the identification of the fly was based on the characteristics of only the larvae. While the examination done on 3rd-instar larvae of common flies in Japan (Ishijima, 1967) has been found to be thorough and detailed, Lukin (1989) and Burgess and Spraggs (1992) suggested that for accurate identification of the species of *Sarcophaga* that cause myiasis, the adult fly as well as the larvae should be examined.

Case 1 indicates a hospital-acquired myiasis, one of several that have been reported in recent years from some countries including Japan; thus, three of four cases caused by *S. peregrina* were acquired in hospitals where the consciousness of the patients was diminished (Table 1). Patients in a hospital setting should be protected from dipterous insects, because bacterial infection may occur when a fly deposits eggs or larvae on a subject and the flora may be spread over by the larvae when the larvae move (Chodash and Clarridge, 1992). As noted, *S. peregrina* is distributed throughout Japan (Ishijima, 1967); myiases caused by this fly species have been found in Hokkaido, Honshu, and Kyushu (Table 1).

We classified the myiasis of Case 2 as wound rather than nasopharyngeal, because the infestation by the larva was found in the exterior post-surgical wound in the face of the patient. In addition, according to Zumpt (1965), while a nasopharyngeal myiasis is defined as an infestation of the nasal fossae, frontal sinus, and/or pharyngeal cavities, anatomically the nasopharyngeal area seems to refer to a specific area of the pharynx, so we would not have defined this myiasis as nasopharyngeal.

Sherman (2000) classified myiases according to the detailed anatomic site of infestation: wound, cutaneous (non-wound), ophthalmo-, aural, respiratory, gastrointestinal, or genitourinary myiasis. We defined the myiasis reported by Kinebuchi and Ikemura (1972) as a wound myiasis rather than urogenital. *S. crassipalpis* inhabits the larger urban areas of Japan (Ishijima, 1967); two cases of myiasis caused by the species were found in Tokyo and Osaka. The incidence of the myiasis between early summer and fall (Table 1) corresponds to that reported in the United States by Sherman (2000). Cancers were the underlying illnesses in four of the six wound myiases caused by both species shown in Table 1. Thus, our findings indicate a need for vigilance and protection against flies for elderly patients with diminished consciousness and/or with post-surgical wounds in hospitals as well as in their own homes.

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REFERENCES


