must be kept clean, without odor of urine and fecals.

When fecal or urine contamination of the skin occurs, the causes must immediately be addressed. Daily inspection of the perianal region is necessary in rabbits suffering from dental disorders (e.g., malocclusion, absence of incisors), digestive disturbances (e.g., diarrhea, uneaten cecotropes), obesity, and infected wounds, as well as rabbits that are disabled (e.g., fracture of the spine or a broken bone, paralysis, arthritis, spondylosis).

6.10 Botfly myiasis

Myiasis caused by larvae of several species of the *Cuterebra* sp. botflies (Figure 6.20A) occurs on the American continent. Botfly infestations are more common during the hot, humid summer months and during fall. *Cuterebra* sp. flies are large and hairy, and are characterized by the absence of a functional mouth. Their life span is short, and aimed only at the reproduction of the species. The botfly larvae that infest rabbits (Meredith, 2008; Weisbroth et al., 1973) and other lagomorphs include *Cuterebra buccata*, *C. cuniculi*, *C. lepivora*, *C. abdominalis*, *C. jelloni*, *C. ruficrus*, and *C. lepusculi* (Baird, 1983; Jacobson et al., 1978; Schumann et al., 1985). The parasitic larvae of these flies can infest humans and other animals as well, including dogs, foxes, cats, minks, and rodents (Beck, 1999; Cerny, 1979; Newell, 1979).

A botfly infestation is not linked to poor hygiene, unlike with fly-strike by non-botfly species. The eggs are not deposited on skin soiled with urine or excrement, but near entrances to rabbit burrows, other lagomorph or rodent burrows or nests, or near outdoor rabbit hutches. House rabbits can also be struck by botfly larvae when a *Cuterebra* fly gets into a home and deposits eggs in the rabbit’s living environment.

![Botfly Cuterebra sp. fly (A) and maggot (B).](image-url)
When the larva emerges from the egg, it will migrate onto a host, typically a lagomorph or a rodent (Harkness and Wagner, 1995). It enters the body of the host through breaks in the skin or natural openings, e.g., the nose or mouth, after which it penetrates the mucosa. The larva (Figure 6.20B) will migrate deeper into the body, using the trachea and the abdominal cavity to move to a subcutaneous location. There it will form a 2-3 cm long furunculoid cystic structure, with a fistula for respiration at the surface of the skin. As the larva increases in size, its presence becomes bothersome for the rabbit. When the larva reaches the stage of pupation, it leaves the cyst and falls to the ground.

Depending on the species of botfly, the furunculoid cysts are found in different parts of the rabbit's body. Larvae of *C. buccata* infest the entire abdominal region, especially the inguinal area, abdomen, and shoulders, whereas larvae of *C. horripilum* have mainly been observed in the neck region.

**A. Clinical features**

The clinical signs are generally sufficient for a proper diagnosis. The early stages of botfly myiasis are subclinical. With time, however, the rabbit becomes depressed, anorexic, dehydrated and weak, loses weight, and can go into shock if the infestation is severe or the maggot is accidentally crushed (Harkness and Wagner, 1995). At this stage the infestation becomes evident, with a visible fistula in the skin accompanied by a lump or a cystic structure (Figure 6.21). Progressively the skin around the hole becomes moist and the surrounding hair matted. The development of secondary bacterial or fungal infections is rare but possible. The condition is painful.

Aberrant migration of larvae into the nasal cavity and sinuses, the eyes, and the thorax has been observed in cats and dogs (Dvorak et al., 2000; Harris et al., 2000; Quesenberry and Carpenter, 2004; Tieber et al., 2006; Williams et al., 1998). Migration into the trachea leads to the formation of laryngeal edema that blocks the air supply to the lungs and can be accompanied...
by concurrent accumulation of mucus and swelling of the esophagus (Bordelon et al., 2009; Fitzgerald et al., 1996). Migration into the brain via the ear canal is a further potential danger. Once in the brain, the larva will cause severe and irreversible neurological damage.

**B. Treatment**

The skin is prepared as for a surgical procedure; the hair is delicately clipped around the infected area and the skin disinfected with an antiseptic solution. After enlargement of the breathing hole, the larva is carefully removed with the aid of forceps, without damaging or crushing it, in order to prevent skin irritation and, especially, the occurrence of a (fatal) anaphylactic reaction. After removal of the larva, the cavity is cleaned with a sterile saline solution as well as an antiseptic or insecticide solution (Harkness and Wagner, 1995; Quesenberry and Carpenter, 2004).

If necrotic tissue is present, the cavity is carefully debrided. If an abscess has formed in the cavity, surgical excision of the tissues is necessary, followed by topical and systemic antibiotic therapy.

The administration of non-steroidal analgesics (e.g., meloxicam, carprofen) is necessary after both surgical and non-surgical removal of the larvae. If the affected rabbit stops eating, it should be hand-fed in order to prevent the onset of hepatic lipidosis.

If a rabbit is heavily infested with botfly larvae, euthanasia should be considered as a humane alternative to continued treatment with a poor prognosis, so as not to unnecessarily prolong the rabbit's pain and suffering.

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**6.11 Bibliographic references**


