



# Battling Bots

by HEATHER SMITH THOMAS

Most internal parasites are worms, but bots are fly larvae. This parasite spends most of its life fastened to the inside of the horse's stomach, drawing nourishment from the blood supply to the stomach lining. These freeloaders cause irritation as well as robbing nutrients from the horse, and can occasionally perforate the stomach wall (which may lead to fatal complications).

The adult bot fly is

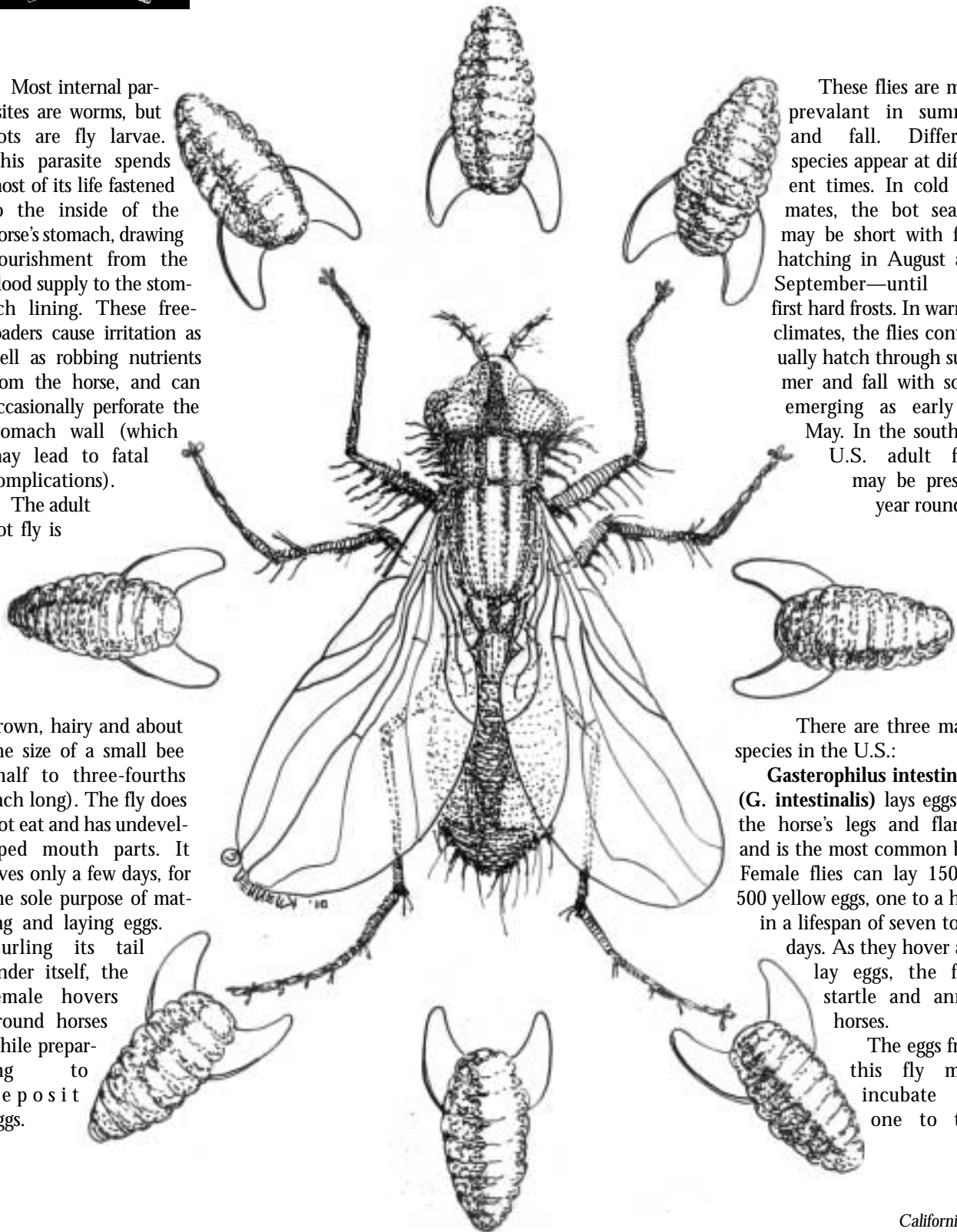
brown, hairy and about the size of a small bee (half to three-fourths inch long). The fly does not eat and has undeveloped mouth parts. It lives only a few days, for the sole purpose of mating and laying eggs. Curling its tail under itself, the female hovers around horses while preparing to deposit eggs.

These flies are most prevalent in summer and fall. Different species appear at different times. In cold climates, the bot season may be short with flies hatching in August and September—until the first hard frosts. In warmer climates, the flies continually hatch through summer and fall with some emerging as early as May. In the southern U.S. adult flies may be present year round.

There are three major species in the U.S.:

**Gasterophilus intestinalis** (*G. intestinalis*) lays eggs on the horse's legs and flanks, and is the most common bot. Female flies can lay 150 to 500 yellow eggs, one to a hair, in a lifespan of seven to 10 days. As they hover and lay eggs, the flies startle and annoy horses.

The eggs from this fly must incubate for one to two



weeks before the larvae are ready to hatch out—the eggs hatch only if the horse licks or bites that part of his body. The moisture, warmth and friction from the horse's licking stimulates the eggs to hatch into tiny, spiny larvae. When the horse licks a hair with a bot egg cemented to it, the egg remains in place on the hair but a cap on the end opens, allowing the larvae to emerge and enter the mouth, where it burrows into the tissue. The hatched (empty) egg capsules are small and flat, rather than plump.

After three or four weeks in the mouth, the larvae molt and become second stage larvae, detaching from the mouth to be swallowed. Migrating to the horse's stomach, they attach to the lining to feed and grow, causing small ulcers. If large numbers of larvae attach near the stomach's outlet, they may physically obstruct food passage, interfering with digestion.

After a few weeks, the larvae molt again to the final stage, spending eight to 10 months in the stomach, absorbing nutrients and growing. The next spring or summer, they detach from the stomach wall, migrating through the horse's intestines with the feed and fecal material, passing out with manure. While traveling through the intestine, the larvae change to the pupal stage, leave the horse, and form hard outer shells. They burrow into the ground where they stay for three to five weeks. When they mature into adult flies and emerge from the ground, the cycle begins again.

**G. nasalis** is also widespread in the U.S. It lays its yellow eggs along the horse's lower jaw. As the flies dart around the horse's head to lay eggs up under the jaw, the horse will jerk its head up or strike out with a front foot in an effort to keep the fly away. The act of laying eggs must be annoying or irritating to the horse—he may run wildly about the pen or pasture in an attempt to get away from the fly. Horses in groups will bunch together, rubbing their chins on each other's backs.

The eggs under the jaw are deposited up in the hair rather than at the ends of the hair, and are less easy to see than eggs on the horse's legs and flanks. Once attached to the hair, they incubate for only four to six days before hatching, and need no external stimulation. The larvae crawl into the horse's mouth and burrow into the gum tissue. After about a month, they follow the same cycle as *G. intestinalis*.

**G. haemorrhoidalis** lays black eggs on the hairs near the horse's lips. They hatch by themselves within two to four days before penetrating the inner lip membrane in front of the incisors. They also follow the same path as their relatives, after five to six weeks in the horse's mouth.

Bot larvae cause stomach inflammation, and a heavy load of bots may cause indigestion, mild colic, unthriftiness and lack of appetite. Large numbers in the gums can create pus pockets and irritation in the horse's mouth.

### CONTROLLING BOTS

Eggs should be removed from the horse as soon as they are observed. The small yellow eggs on legs, shoulders and flanks can be easily seen and picked off with your fingers,

trimmed off with scissors or a safety razor, or scraped off with sandpaper. Washing will not remove them. Eggs under the jaw are harder to see and remove because they are deposited deep in the hair. Smearing petroleum jelly along the bottom of the jaw will kill the eggs by sealing off their air supply and suffocating the developing larvae.

Removal of eggs was the only means of bot control until carbon disulfide came into use after World War I. It was about 80 percent effective at removing bots from the stomach, and was administered by stomach tube so it would not burn the horse's mouth and throat. To be effective, this treatment required withholding feed from the horse for 18 hours before administration and for four hours afterwards. Occasionally, this chemical had some adverse side effects, but was the only effective boticide until 1964, when trichlorfon came into use. This organophosphate could remove 90 to 95 percent of the bots in the stomach. It was often used in combination with one of the benzimidazole drugs to control strongyles at the same time.

Another organophosphate, dichlorvos, came into use as slow-release granules to mix with grain, but it was often difficult to get horses to eat it. Dichlorvos gels and pastes were introduced as a more reliable method for getting the drug into the horse.

Ivermectin (first used as an injectable and now as an oral liquid or paste) is the most effective dewormer in use today for bots. It also controls other internal parasites (except tapeworms) as well as bloodsucking ticks, lice and mites. Unlike other drugs that poison the parasites, ivermectin paralyzes them. Unable to move or eat, they die. The drug is not harmful to mammals, but kills migrating bot and worm larvae regardless of where they are in the body, not just in the stomach.

Traditionally, horse owners treated for bots once a year—late in the fall after hard frosts killed the remainder of adult flies. Treatment was aimed at killing the bot larvae while they were all in the stomach. In warmer climates, however, more treatments were needed. Horses with heavy infestations might suffer adverse effects from the deworming, passing a large number of dead larvae (which could occasionally create a blockage) and leaving large areas of raw and ulcerated stomach tissue where the dying bots detached. The raw areas could absorb too much of the drug and make the horse ill.

With ivermectin, however, treatment can be given as needed. In regions with a long botfly season, treatment should begin about one month after the first eggs are laid, and again at two month intervals throughout the fly season, until winter. If using ivermectin for control of other internal parasites, bot control is accomplished at the same time.

Some horse owners are using the newer drug moxidectin (part of the same avermectin family as ivermectin) in worm control programs. Moxidectin is more effective against encysted small strongyles, but less effective against bots than ivermectin, so this factor must be taken into consideration when creating a parasite control program.