

ORIENTAL EARTHWORM AND ITS CONTROL

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The earthworm (*Pheretima hupeiensis* Mich.), a pest in golf-course greens, originated in the Orient. It gained entrance to this country some years ago, and is now known to occur at one or more points from Stamford, Conn., to Miami, Fla. It is manifest in greatest abundance, however, in the New York Metropolitan area, where at least 50 per cent of the golf courses in Westchester County are to some extent infested.

Pheretima varies in size from 150 mm. to 222 mm. in length and is about 5 mm. in diameter. In general it is light grass-green in color on the dorsal surface. The underside of the worm is grayish-pale in color. It is extremely active at all times, especially when handled, coiling and recoiling convulsively. Furthermore, it discharges a disagreeable secretion, thus the common name "stinkworm."

When weather conditions permit, the earthworm may cast during all four seasons of the year. There are records available of casting counts varying from a few to 50 to the square foot. Obviously when large numbers of castings appear on the surface of golf-course greens, once or several times in 24 hours, it is virtually impossible to maintain a putting surface in a desirable playing condition.

It has been found that *Pheretima* may occur in all types of soil and in all parts of an infested golf course—greens, tees, fairways and rough. They are most abundant, however, in the greens where fertility and moisture are highest.

In 1948 a program of research was undertaken in Connecticut and New York designed to develop effective and economical control measures. At first Parathion was used at extremely high dosage levels. The results obtained with this material in destruction of the Oriental earthworm were remarkable. However, where the toxicant was applied several times to the turf, temporary injury resulted. Turf areas treated with Parathion in 1948 have been free from infestation since the spring of 1949.

Chlordane and Toxaphene 50 per cent wettable powders, used at the rate of 80 pounds of technical toxicant to the acre, were rather slow in controlling *Pheretima* populations. It appeared, however, that 10 to 12 months subsequent to treatments the greens were virtually free from earthworms. Aldrin (Compound 118) used as a 2½ per cent dust in mid-summer, 1948, excited the earthworm population more noticeably than other chemicals. In fact, soil castings and surface worms on Aldrin-treated greens far exceeded in number anything that had been seen up to this time. Reduction in *Pheretima* infestation seemed to be rather slow, however, and it was not until the following spring that control appeared to have been attained.

In late spring, 1949, emulsifiable concentrates containing Chlordane were applied to *Pheretima* infestations at the rate of one quart of 48 per cent emulsion (one pound of technical toxicant per quart of emulsion) in 10 gallons of water to 1,000 square feet. At a later date Aldrin emulsifiable concentrate was used also at the rate of 3 pints of 25 per cent emulsion (one-half pound technical toxicant per quart of emulsion) in 10 gallons of water to 1,000 square feet of *Pheretima*-infested turf. Treated turf was drenched with clear water for three days following treatment.

Both of these materials were amazing in their rapidity of action. Earthworm populations diminished rapidly and virtually disappeared in a few weeks. As quickly as the worms surfaced on emulsion-drenched turf (during rainy weather) they died. In contrast, greens that were not treated were covered with healthy stinkworms, all of which returned to the soil in a normal manner when the rain stopped falling.

It is too early to predict what the residual activity of Chlordane and Aldrin may be when employed to control *Pheretima*.