

# WHAT TO DO FOR WORMS?

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## Rhode Island Experiments Indicate Lead Arsenate Is Best Permanent Control

**E**ARLY IN the spring of 1932 one of our progressive greenkeepers, James Lawson of the Misquamicut Golf Course, came to the experiment station for information as to the comparative value of some worm materials for use on fairways. It was difficult to obtain a good lie on his fairways and the club members wanted certain and quick relief. It was a question of what to use in order to obtain the greatest control at the least expense. Whatever the treatment, it would have to be applied dry since fairway irrigation was not practicable.

In the emergency it was thought advisable to use arsenate of lead at 5 lbs. per 1,000 sq. ft. (216 lbs. per acre) applied mixed with a considerable bulk of screened sand. The application was made with very good results, but the incident prompted a test on an adjoining area. Some of the materials which might have been used and which are in rather common use among greenkeepers were tried.

An area which measured 60 by 40 feet was subdivided into 24 plats 10 ft. square. Before treatments were applied all worm casts then visible through the turf were counted in two-yard squares in each plat as shown in the table under June, 1932. Each worm material was applied in duplicate, mixed with approximately 6 qts. of screened soil and consisted of four rates of arsenate of lead, three rates of bichloride

of mercury, one each of mowrah meal, G. & O. worm eradicator and tobacco fertilizer; four plats were left untreated. A soaking rain came during the first night after the plats were treated which should have favored the mercury and the mowrah meal.

Plans were made to count the casts at intervals in order to discover what materials and rates were effective and how long the control would persist. Counts were made in August and October of 1932 and again in May of 1933. The weather had been dry prior to the August count and there were only a few casts as shown in Table 1. However, the high rates of arsenate of lead and tobacco fertilizer had reduced the number of casts decidedly. The percentages of control (Table 2) for August show that arsenate of lead at 10 lbs. was 94% effective, tobacco fertilizer second, and arsenate of lead at 7.5 lbs. third and at lower rates of more value than any of the other materials. Although bichloride of mercury at 1½ and 3 oz. gave apparent control, there was no control with 6 oz. and this throws some doubt as to the reliability of the figures for the lower rates.

An analysis of the October count shows that control with arsenate of lead at all rates was higher than all other treatments by a safe margin. Tobacco fertilizer had fallen to 45% and G. & O. worm eradicator had risen to 37% of effectiveness. It is

TABLE I

Average number of large worm casts per square yard under various duplicate treatments during the period from June, 1932, to May, 1933

Materials	Application per 1,000 sq. ft.	Large Worm Casts per Square Yard			
		Before June, '32	vs. Aug., '32	After Treatment Oct., '32    May, '33	
Arsenate of lead.....	10.0 lb.	28.2	.5	1.0	1.5
Arsenate of lead.....	7.5 lb.	28.0	2.2	.5	1.0
Arsenate of lead.....	5.0 lb.	22.0	3.5	2.2	3.0
Arsenate of lead.....	2.5 lb.	22.5	2.5	6.5	15.2
Bichloride of mercury.....	6.0 oz.	28.7	8.2	27.5	31.0
Bichloride of mercury.....	3.0 oz.	23.5	4.7	30.5	40.5
Bichloride of mercury.....	1.5 oz.	25.0	5.5	32.7	39.2
Mowrah meal .....	15.0 lb.	31.0	8.2	32.2	39.5
G. & O. Worm Eradicator...	10.0 lb.	27.5	7.5	19.5	27.0
Tobacco Fertilizer .....	75.0 lb.	23.7	1.7	17.2	33.0
Checks .....	None	19.0	8.1	30.8	41.4

TABLE II

Calculated control of earthworm casts obtained with various treatments during the period from June, 1932, to May, 1933

Materials	Application per 1,000 sq. ft.	Control in per cent		
		Aug., '32	Oct., '32	May, '33
Arsenate of lead.....	10.0 lb.	94	97	96
Arsenate of lead.....	7.5 lb.	73	98	98
Arsenate of lead.....	5.0 lb.	57	93	93
Arsenate of lead.....	2.5 lb.	69	79	63
Bichloride of mercury.....	6.0 oz.	0	11	25
Bichloride of mercury.....	3.0 oz.	42	0	2
Bichloride of mercury.....	1.5 oz.	32	0	5
Mowrah meal.....	15.0 oz.	0	0	5
G. & O. Worm Eradicator...	10.0 oz.	7	37	35
Tobacco Fertilizer.....	75.0 oz.	79	45	20
Checks.....	None	0	0	0

interesting that arsenate of lead at the rates of 5, 7½ and 10 lbs. per 1,000 sq. ft. were all over 90% effective.

The count in May, 1933, did not add a great deal to the data of 1932 and showed continued good control for arsenate of lead, a slightly higher control for the 6-ounce application of bichloride of mercury and waning control from the G. & O. and tobacco materials.

Although the test was designed primarily as a comparison of worming treatments for the fairway, the results are entirely applicable for greens, lawns and play fields. It is probable that doses aggregating 3 to 5 lbs. of arsenate of lead per season should not be exceeded for greens composed largely of velvet bent. Just how much arsenate of lead is injurious to *Poa annua* is also a question. In tests at other stations this grass has proven more sensitive than the bent grasses or Kentucky blue grass.

Since the experimental plats were conspicuously situated, they were all treated with arsenate of lead and the test was automatically terminated early in 1933. Somewhat less control would have resulted from the use of arsenate of lead on a less acid soil or on a soil heavily fertilized with manure for a number of seasons. On the whole arsenate of lead appears to be the most effective worm remedy for general use in turf.

### British Greenkeeping Research Report Makes Yanks Sob

ANNUAL report of British Board of Greenkeeping Research for 1934 reaches the U. S. as news of the abandonment of the Arlington turf garden and sharp curtailment of other activities of the USGA Green section is causing consternation in this country among those responsible for golf course maintenance.

A significant sentence stating the policy of the BGR: "The research work must not be allowed to suffer, as it is from the knowledge gained from research that the station is able to give service to clubs in advice of a standard not elsewhere obtainable." The BGR reports "an extensive program of research work is in hand."

The BGR was established in February, 1929, by the joint advisory council of the Golf Unions of England, Scotland, Ireland and Wales. It acknowledged that its inspiration, organization and operations were so vigorous and helpful at that time. Failure to finance the Green Section work adequately has this Yank enterprise hanging on the ropes while the BGR reports itself in its strongest position after its most successful year and is planning to extend its work.

The usual early bellyaching and battling between greenkeepers and the British equivalent of the Green Section has been eliminated and the British Greenkeepers' Advisory committee reports: "The Advisory committee feel that although valuable results have been obtained as a result of experimentation both on the field and trial plots, many more years of experimentation must go on before final conclusions can be drawn."

BGR expenditures in 1934 were approximately \$23,600 against USGA Green Section budget for the same year of approximately \$14,400. The BGR excess of receipts over expenditure was around \$1,870.

During 1934 the BGR served by correspondence advice or visits 1,564 golf clubs in England, Scotland, Ireland, Wales and abroad.

The BGR report tells a story of what the British have done successfully with an American golf service idea.