

The worm TURNS

tions to ensure that they do not favour heavy earthworm activity. Research on management methods during the 1920s and 1930s indicated that it was possible to modify the soil and turf environment making it less attractive for earthworms. There are two main factors influencing earthworm populations which can be controlled, these being food supply and soil pH. It was shown that the supply of food could be reduced by boxing off mown clippings and using inorganic fertilisers. Observations in the 1930's indicated that heavy dressing of organic fertilisers such as poultry manure, rape or castor meal should be avoided as they were a source of available organic matter. Removing clippings undoubtedly decreases earthworm activity. R.B. Ferro, writing in the 1937 Journal of the Board of Greenkeeping Research, showed that boxing off of clippings on bentgrass turf reduced the rate of casting by 58%. Reduction of thatch by regular aeration and scarification should also further restrict the supply of food.

A reduction in soil pH generally results in a lowering of the earthworm population, as well as encouraging the more desirable bent and fescue grass species. Work by Jefferson given in Figure 1 clearly shows the theoretical response curve of earthworm numbers to soil pH. In particular the important casting species *Apporectodea longa* and *A. caliginosa* known to be intolerant of acid soil conditions.

The use of acidifying fertilisers such as ammonium sulphate or ammonium nitrate will tend to decrease soil pH and hence reduce earthworm activity. Conversely fertilisers such as nitrochalk, sodium nitrate or basic slag induce alkalinity or a neutral reaction and should generally be avoided on sites where excessive earthworm casting is likely to be a problem. Iron sulphate also tends to reduce earthworm casting and in some circumstances sulphur and aluminium sulphate can be used to manipulate soil pH.

Addition of lime will normally

increase earthworm numbers and thus lime-rich top dressing materials should be avoided. The early work by Ferro (1937) showed that rates of casting on plots top dressed with a lime-rich sea sand were almost double that of turf dressed with a lime-free river sand. In general rootzone mixes and top dressing materials should have a calcium carbonate content <0.5% otherwise they can raise pH causing problems with weeds, disease as well as earthworm activity.

RESEARCH TRIALS

Thanks to financial support from the R&A we have already started a number of trials to start examining methods of earthworm control now that the use of chlordane is illegal. Firstly, we are examining methods of chemical control that can still be used. Three chemicals (carbaryl, carbendazim and gamma-HCH plus thiophanate-methyl) are still approved for use in earthworm control. We are evaluating the effectiveness of these chemicals at three sites and in particular examining the required application frequencies.

Secondly, we are examining acidification techniques. As mentioned above, earthworm activity is strongly influenced by the pH of the soil and for example the over zealous use of lime on golf fairways in the past undoubtedly contributed to problems of casting. Certain earthworm species eg. *Dendrobaena octaedra* and *D. rubida* are tolerant of acid conditions but two of the main casting species *Apporectodea longa* and *A. caliginosa* will not tolerate acid conditions. A pH of about 5.0 represents their lowest tolerance and this can be used as a method of cultural control on golf courses. If the pH gets too low it will obviously affect grass growth but a balance with a slightly acid soil which permits the healthy survival of the finer turf grasses but decreases earthworm activity is an advantage. To this extent we are examining the use of sulphur and aluminium sulphate to modify the pH of fairway soils looking at both application rates and application

frequency. For example two applications of sulphur and aluminium sulphate at the highest rates in the trial in autumn 1993 and spring 1994 brought the surface pH down from 5.8 to 4.5 and casting rates from October to December 1994 were typically only 25% of those of untreated plots. However care has to be taken on application rates because of problem of scorch and weakened grass growth so further work is still required on this trial.

A second trial is examining surface acidification by iron sulphate, in particular its application frequency and interaction with carbaryl, carbendazim and gamma-HCH plus thiophanate methyl.

EXPELLANT MATERIALS

In the past expellant materials, eg. Mowrah meal and potassium permanganate were used, being applied to turf and thoroughly watered in. The material acted as an irritant causing the earthworms to rise to the surface where they could be brushed into piles and remove by wheelbarrow. If future legislation on earthworm control becomes even more stringent we may be forced into adopting these time consuming

and undoubtedly messy procedures. We have thus started some preliminary investigations of expellent techniques using potassium permanganate, formaldehyde, mustard and even vindaloo curry powder, but contrary to some press reports, we are still a long way from the stage of recommending a visit to the local Indian take-away as a source of worm control materials!

REMEMBER THE ADVANTAGES OF EARTHWORMS

On areas other than greens, earthworms have many advantages most notably with respect to the development of soil structure, soil fertility and the breakdown of organic matter. If a decision is made to control earthworm activity, careful thought should take place beforehand to ensure that the advantages of reduced casting outweighs the potential disadvantages of structural deterioration and thatch development. Nevertheless heavy rates of casting bring problems to the greenkeeper and golfer alike and it is hoped that this research will lead to more environmentally acceptable methods to reduce the casting problem.

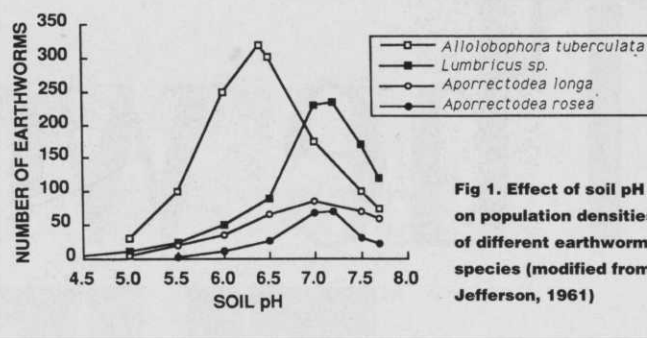
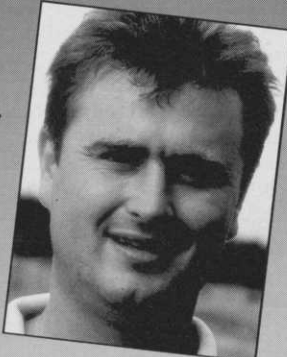


Fig 1. Effect of soil pH on population densities of different earthworm species (modified from Jefferson, 1961)

What's the *Best* thing about being a Greenkeeper?

Shaun Richards...

"If you've got a love of the game it's great to be involved working in it. Also seeing the fruits of your labours coming together when competitions are played on your course."



Magnificent team effort

have been rebuilt and a new practice range purchased and developed.

"R&A Agronomist David Stansfield said that we had effectively completed a 20 year programme in five years," said David.

In addition to the programmed work the 2nd green had to be rebuilt in '91 after it was lost through flooding in a storm.

Royal Porthcawl is one of the finest links in the country and a worthy site for one of the foremost international golf matches, professional or amateur.

In the Walker Cup programme, Peter Corrigan, enthused about the view from Royal Porthcawl across the bay to Swansea. Peter, a Welsh golf writer who should know about these things, said, "The arrival of the Walker Cup to our treasured course will ensure that thousands will be sharing that view with us – unless it is raining in which case you'll have to take our word for it."

Prophetic words indeed because although the weather on the first day was ideal with sun and a light breeze the second day had latter day Noahs rolling up their sleeves and digging out their tool boxes.

It was then that the BIGGA Greenkeeping Support team showed its true worth. Gathered from clubs in the immediate area – with others from Hereford,



A rare sight: Sun on the opening day

Birmingham and two from America, Ed Walsh, from New Jersey and Peter Cassidy (allowed on the team only if they didn't cheer for the opposition!) – the team was able to adapt to the additional work brought about by the conditions. While conventional weather saw two bunker rakers accompanying each morning foursomes match and one with each of the eight afternoon singles the torrential rain called for squeegy operators to walk with each match and a scout, Paul Rosser,



What's the *Best* thing about being a Greenkeeper?

Bob Lupton...

"I enjoy presenting the course for the members and building it up to a peak for a specific occasion. There is a certain amount of satisfaction seeing the benefit of all the hard work."



to walk ahead of the matches.

In the main the course continued to play well and survived the onslaught from above and the squeegy team was not called into action until the final match of the day to go the distance reached the 18th green and a huge puddle had to be forceably removed to the cheers of the galleries before the approach shots could be played. By that time, however the Cup had been won

and celebrations were well under way.

"I was delighted with the professional way our members worked and I know the work was appreciated by the organisers and especially the players. I also received a visit from Royal Porthcawl's Chairman of Green who asked my to pass on his thanks to the team," said Peter Lacey, the local section secretary who co-ordinated the team.



Education Update

BY KEN RICHARDSON

BIGGA courses will keep you up to date

This month we include a further reminder for those greenkeepers considering attending this year's supervisory and management courses, at Aldwark Manor and Elmwood College, information on next year's supervisory and management courses in Ireland, the Midlands, the North, the South East and the South West, and information on the 1996 Massey Ferguson Machinery Workshops and news of the Learning Experience 1996.

BIGGA SUPERVISORY AND MANAGEMENT COURSES

Places are still available on this year's BIGGA Supervisory and Management Courses. The courses, which proved to be very popular last year, provide greenkeepers with important supervisory and management skills. You might just have time to book a place if you can contact me straight away and forward a cheque for £117.50. Head greenkeepers who have not received any formal supervisory or management training should advise their clubs that grants of £150 may be available from the GTC to help with the cost of sending their greenkeepers on one or more GTC endorsed management courses.

The 1995 series of BIGGA Supervisory and Management Courses has been designed not only to meet the underpinning knowledge requirements of S/NVQ Level 3 Units but also to introduce elements S/NVQ Level 4. BIGGA courses are open to all greenkeepers who need to improve their supervisory and management skills. The courses are:

- Module 1: Managing People 1. October 16 – October 20. Covering team building, interpersonal skills, leadership, time management and computers in greenkeeping.
- Module 2: Managing People 2. October 30 – November 3. Covering assertive communication, influencing skills, grievance and discipline and computers in greenkeeping.
- Module 3: Managing Opera-

tions and Resources. November 6- November 10. Covering planning and organising, estimating cost, budgets and project management.

■ Module 4: Managing Information. November 13 – November 17. Covering writing memos, letters and reports, communication skills, collecting and recording information.

■ Module 5: Management Techniques. November 20 – November 24. Covering level 4 management techniques. Topics include maintenance and improvement of service and operations, project management, negotiation skills and quality assurance.

All course delegates and employers will receive an end of course summary. This could be used to provide evidence for N/SVQ assessors.

Attendance at each year's course qualifies for eight credits towards the Master Greenkeeper Certificate.

The cost per week, including accommodation, all meals and tuition fees is £420 + VAT for BIGGA members and £475 + VAT for non-members.

If you need advice on which week to attend or have any other queries call me on 01347 838581.

Send your application NOW.

Regional Supervisory and Management Courses

A few places on the Scottish Region two-day supervisory and management course are still available. These residential courses, which will be held on October 16/17 and October 18/19, have been introduced to make management training more accessible to all BIGGA members. Each course costs £50 for BIGGA members and £150 to non-members. Reserve your place by sending a deposit of £10 to BIGGA HQ.

The Northern Region two-day supervisory and management courses will be held in Chester on February 12 and 13 1996 and in York on February 14 and 15 1996.

The Midland Region two-day supervisory and management

courses will be held in Kettering on February 5 and 6 1996 and in Birmingham on February 7 and 8 1996.

The South East Region two-day supervisory and management courses will be held in Brighton on February 5 and 6 1996 and in Dover on February 7 and 8 1996.

The South West Region two-day supervisory and management courses will be held in Bristol on February 12 and 13 1996, in Bournemouth on February 14 and 15 1996 and in Plymouth on February 19 and 20 1996.

The Southern Ireland two-day supervisory and management courses will be held in Killarney on March 7 and 8 1996.

These courses have been designed to introduce supervisory skills to those greenkeepers moving into supervisory positions for the first time and for experienced supervisors who are having to cope with change and include time management, oral and written communication, team building, discipline and motivation. Each course is limited to twelve delegates and costs just £50 per delegate (thanks to a large subsidy from the BIGGA Education and Development Fund), which includes

all tuition meals and one night's accommodation. Reserve your place now.

Massey Ferguson Machinery Workshops

The 1996 Massey Ferguson Machinery Workshops will take place at Elmwood College, Cupar Fife on April 1 1996 at Warwickshire College, Moreton Morrell Warwickshire on February 19 1996 and Oaklands College, St Albans Hertfordshire on March 11 1996. Each workshop will run from Monday lunchtime until Friday lunchtime and will include sessions on the selection, use, maintenance and running costs of mid mounted, front mounted and compact tractors and will give delegates practical "hands on" experience.

Colleges will, shortly, be invited to nominate up to two students to attend the course, however places are limited to 12 delegates on each course and some selection may have to take place.

Delegates will be allocated a place on the workshop nearest to their home/college. All travel, accommodation and tuition costs will be met by Massey Ferguson.

Watch out for further details in future editions of *Greenkeeper International*.

What's the Best thing about being a Greenkeeper?

Keith McCartney,
Dumfries and Galloway GC
"I enjoy it when visitors who have come to the course take the trouble to come up and say that it is in good condition and that they enjoyed playing it."

