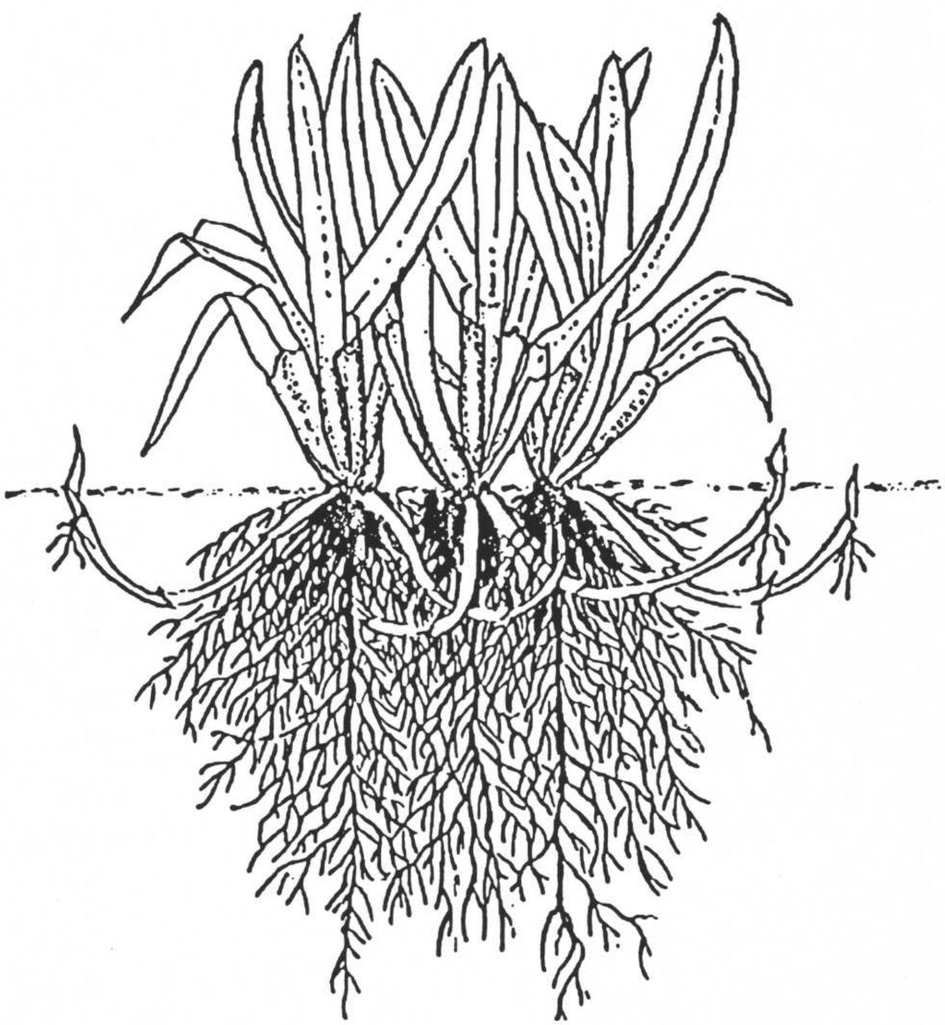
Lawn Care & Athletic Field Management Tour



LAF 1

Hancock Turfgrass Research Center Expansion: Soil Modification

James Crum, Trey Rogers, and Paul Rieke
Crop and Soil Sciences

Through the industries help and support, an expansion of the research facilities is nearly complete to address the need for soil modification research. In many areas of the turfgrass industry, whether it be golf courses, athletic fields, or home and commercial landscapes, the soil is, or has been, modified to some extent. Because of the need for rapid water infiltration and drainage, increased aeration porosity, and low susceptibility to compaction, very sandy materials are generally used to do the soil modification. One of the major problems associated with these sandy materials is the low available water-holding capacity and the lack of cation exchange capacity. Within the soil modification section we are going to be studying and comparing native (natural) soils versus very sandy materials for water and fertility requirements during establishment and turfgrass maintenance.

In total there are four blocks that will allow us to conduct soil modification research. Included are, from the west, a block for native soil athletic field research and in the next block to the east is located a block of modified soil for athletic field comparison. Within this modified block are located three 60 by 60 feet blocks of twelve inches of 80 percent sand and 20 percent peat and a 60 by 60 foot block of Prescription Athletic Turf (PAT) with a barrier, drainage pipe, twelve inches of sand with a small amount (5%) of surface incorporated peat. The PAT field has the advantage that the drainage lines are connected to pumps that can either remove excess soil water or be reversed to subsurface irrigate. We are pleased that Turfgrass Services, Pueblo, Colorado, has donated the equipment for the PAT field to allow us to conduct the comparison research.

To study the irrigation requirements of turfgrass on modified soils, we installed a block of three treatments of native soil, 80:20 sand-peat mix (USGA), and 70:10:20 sand-peat-soil mix, replicated three times. Drs. Vargas and Rieke will conduct this research to develop irrigation recommendations for these soils under the given conditions.

The remaining block contains a USGA specification putting green where establishment, maintenance, fertility, and irrigation work will be done.

LAF 2

Irrigation of Newly Planted Trees

Robert E. Schutzki
Department of Horticulture

Soil balls of balled and burlapped nursery stock often contain different textured soils from those at landscape sites. The same is true for trees transplanted by mechanical tree spades. Current planting technique has focused on root regeneration and planting backfill as a major factor in successful establishment. Little attention has addressed problems associated with textural differences between the plant soil ball and existing site conditions. The lack of soil moisture movement across the plant ball/backfill interface often results in plant stress during establishment. The diversity in soil types also results in uneven root ball wetting during irrigation. The consequence is a deterioration of plant quality during the initial establishment, which could have long term effect on the overall quality of the landscape.

Over the past several years, we have investigated the deterioration of plant quality on many landscape sites throughout Michigan. The problems have generally occurred on plants within four years of installation. Using a soil probe, we have extracted soil cores from the plant soil ball, the planting backfill and the undisturbed site. In many cases the plant soil ball was extremely dry when compared to planting backfill and undisturbed site conditions. Irrigation was maintaining adequate soil moisture in the planting backfill, however, filtration down or movement of soil water into the ball or spaded plug was not occurring.

Nursery stock depends on the moisture within the soil ball or plug during initial establishment. It is extremely important that the monitoring of newly planted stock include examination of the conditions within the root ball/plug.

The problems of discontinuity between soils cannot be over come simply by increasing the duration of irrigation. Irrigation method must account for and accommodate soil conditions within the soil ball or plug. The maintenance of tree soil ball moisture during initial establishment will aid in the future development of the landscape.

LAF 3

Developing Thresholds for Grubs

Dave Smitley
Entomology Department

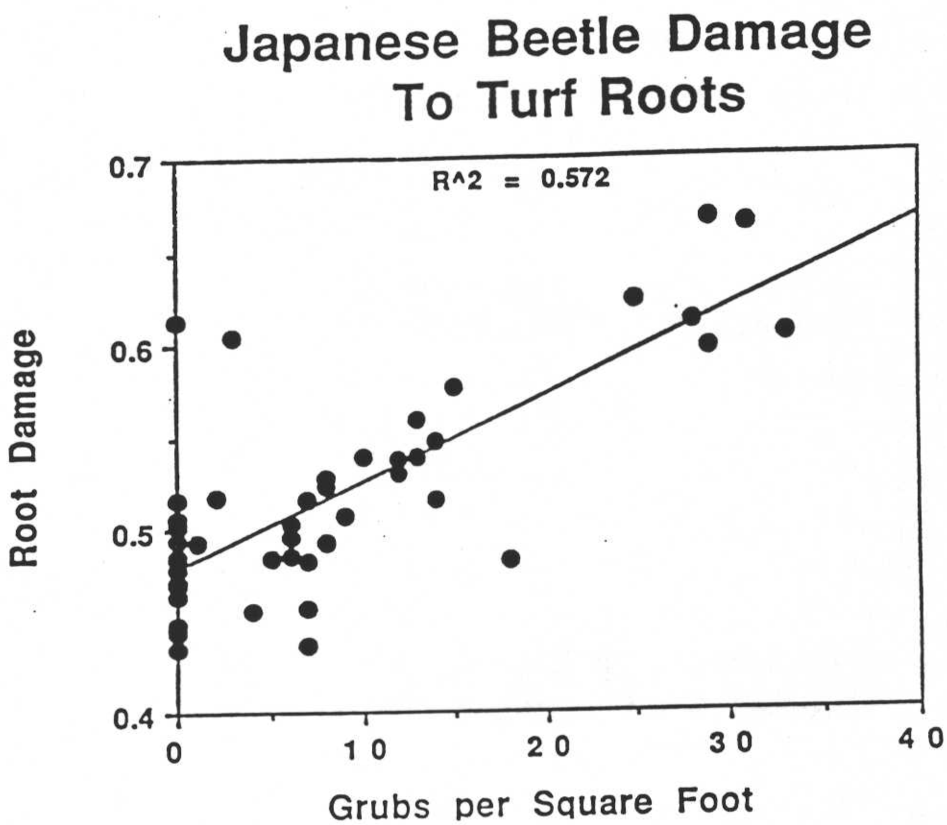
In October of last year I was swamped by phone calls from lawn care companies, golf course superintendents and homeowners asking about grubs. In Michigan and parts of other midwest states turf damage from grubs was unusually severe last fall. Japanese beetle, masked chafer, and European chafer are the key species of beetles responsible for most of the grief to lawn-care companies. The larvae of these beetles are called white grubs. They feed on grass roots, and in heavy infestations may consume all of the root system, leaving grass plants vulnerable to water stress. The combined range of these beetles extends from Florida to Maine and from the Atlantic Ocean to the Mississippi River. The masked chafer may also cause problems in Texas, Missouri, and Nebraska. The greatest damage from grubs last fall occurred in states where there was a fall drought. This connection between water stress and grub damage is not a new idea. Dr. Potter described the number of grub-related service calls received by a lawn care company over several years (Amer. Lawn Appl. July/August 1981). From August to October of 1977 they had 8 inches of rain and 170 service calls about grubs. During the same period in 1979 they had 16 inches of rain, and only 17 service calls. Entomologists are coming to the same conclusion: turf that receives enough rain or irrigation to keep the soil moist throughout the period of grub feeding will remain green even if infested with grubs.

During the last two years I have been investigating how many Japanese beetle grubs per square foot are necessary to cause turf injury. Grub injury to turf can be measured by growing turf in rooting boxes and adding different numbers of grubs to each box. In 1991, the amount of root damage to Kentucky bluegrass increased linearly as the number of grubs per square foot increased (Fig. 1). Relatively severe root pruning occurred when more than 20 grubs per square foot were added to rooting boxes. However, the daily irrigated turf still remained green. We concluded that turf infested with more than 20 grubs per square foot may die quickly during a drought period because of an insufficient root system.

This year we want to determine how well grub-infested turf survives under water-stress conditions. The turf plots will be established with different numbers of Japanese beetle grubs in August. In September, after the grubs have been feeding long enough to cause extensive root damage, half of the plots will be covered with a clear plastic frame-house to shield them from rain. In this way we will determine how many days of drought stress can be tolerated by grub infested turf.

This research project is supported by the Michigan Turfgrass Foundation.

Figure 1. The amount of root damage to turf grown in rooting boxes with different numbers of Japanese beetle grubs.



LAF 4

Crabgrass Control Strategies in Home Lawns and Fairway Turf

B.E. Branham, D.W. Lickfeldt, R.N. Calhoun
Crop and Soil Science

Crabgrass has not lost any of its popularity as the number one annual weed problem in home lawns and golf course settings. Consequently the turfgrass industry has made great strides towards developing control strategies for this pest. In Mid-Michigan, 1992 has turned out to be a very 'weak' year for crabgrass germination and development, evidenced by the sparse populations of crabgrass that have developed in traditionally problem areas.

We initiated a study in late April of 1992 which included 53 different herbicides, herbicide combinations, herbicide rates, and application timings (See Table). As of July 20th, little crabgrass growth and development had occurred. However, this is expected to change with the increased rainfall and temperatures observed so far this July.

Regardless of what control strategy will be implemented, the turf manager must be fully aware of the areas that are a problem. The days of annually treating a lawn or a golf course with the old standby 'Weed and Feed' may soon come to an end. A good IPM program requires extensive monitoring of problem areas throughout the growing season. In Mid-Michigan preemergence applications should be completed within the first two weeks of May. This application can be moved into late May if there is an unusually dry and/or cool Spring. For turfgrass managers located in Southeastern or Southwestern Michigan, the above timings may be too late due to temperature increases that traditionally come earlier in those parts of the state. Preemergence herbicides applied after June 1 will give some control of the later germinating plants, but many crabgrass seeds will have already germinated.

With the introduction of a new generation of grass herbicides which exhibit both preemergence and postemergent modes of action, DIMENSION and DRIVE, turfgrass managers have several control strategies that were never before available. Rather then building the preemergence herbicide barrier before we know what kind of pressure we have, we can wait until the grass emerges and treat only those areas that are a problem. The timing of a postemergent application is critical. The herbicide must be applied early enough to easily control the crabgrass before it has a chance to harden off. Likewise, the treatment must be late enough to extend the 'window of control' for preemergence activity as far as possible into the growing season. It is feasible with these new products to achieve acceptable season long control with one application.

Regardless of the strategy that you choose, and there are clearly many products from which to choose, spend more time monitoring the areas that are a problem and less time treating every area under your supervision.

PERCENT CRABGRASS - JULY 20, 1992

HERBICIDE TREATMENT	RATE (lbs ai/A)	% CRAB.
UNTREATED CONTROL		11
BALAN 2.5G	1.5 + 1.5(8 WAIT)	0
BALAN 2.5G	3.0	0
TEAM 2G	2.0	2
TEAM 2G	3.0	0
TEAM 2G	1.5 + 1.5(8 WAIT)	0
FN9064 1.09G	2.725	0
FN9064 1.09G	4.09	0
AND[1] 19-3-8 w/TEAM	1.5 + 1.5(8 WAIT)	0
LESCO 19-3-7 w/PREM	1.5 + 1.5(8 WAIT)	0
LEBANON 19-4-6 w/Betasan	7.5	1
RONSTAR 2G-BIO.	2.0	0
RONSTAR 2G-BIO.	4.0	0
EXP 30742B	5.0	0
EXP 30742B	6.0	0
EXP 30909A	5.0	1
EXP 30910A	5.0	1
EXP 30910A	6.0	0
EXP 30910A	3.0 + 2.0(8 WAIT)	0
EXP 30925A	5.0	1
RONSTAR/DIMENSION (0.1G)	2.0 + 0.25	0
RONSTAR/DIMENSION (0.1G)	1.0 + 0.25	0
RONSTAR/DIMENSION (0.1G)	2.0 + 0.125	0
RONSTAR/DIMENSION (0.1G)	1.0 + 0.125	0
PRE-M 60WDG	3.0	0
LEBANON (Fert/Dimension)	0.125	0
LEBANON (Fert/Dimension)	0.25	0
LEBANON Fertilizer only	see above	14
LEBANON Fertilizer only	see above	3

HERBICIDE TREATMENT	RATE (lbs ai/A)	% CRAB.
BARRICADE 65WG	0.325	0
BARRICADE 65WG	0.65	0
GALLERY 75DF	1.5	0
GALLERY 75DF	1.5 + 1.5(8 WAIT)	0
AND 260-Dithiopyr + 18-6-15	0.165	0
AND 260-Dithiopyr + 18-6-15	0.25	0
AND 263-Dithiopyr + 18-6-15	0.1	0
AND 263-Dithiopyr + 18-6-15	0.125	1
AND 264-Prodiamine + 20-4-10	0.25	2
AND 264-Prodiamine + 20-4-10	0.375	0
AND 264-Prodiamine + 20-4-10	0.50	0
AND 267-Dithiopyr + 19-3-8	0.18	0
AND 267-Dithiopyr + 19-3-8	0.25	0
AND 269-Prodiamine + 19-3-8	0.375	0
AND 269-Prodiamine + 19-3-8	0.5	0
DIMENSION 1EC (Pre.)	0.5	0
DIMENSION (Post. 2 leaf stage)	0.5	1
DIMENSION 0.1G (Pre.)	0.125	0
DIMENSION 0.1G (Pre.)	0.25	0
DIMENSION 0.1G (Pre.)	0.38	0
DIMENSION 0.11G (Pre.)	0.25	0
DIMENSION 0.11G (Pre.)	0.38	0
DIMENSION + MSMA + 0.5% X-77 (Applied July 20)	0.38 + 1.0	2
DIMENSION+ACCLAIM + 0.5% X-77 (Applied July 20)	0.38 + 0.094	8
LSD (P=0.05)		3

[1] AND is the abbreviation for ANDERSONS

LAF 5

CULTIVATION PROGRAMS FOR THATCHY TURFS

P. E. Rieke
Crop and Soil Sciences

Cultivation (or aerification) can be used to correct a number of turf/soil related problems, among which are thatch problems and compacted soils. Many home lawns and general grounds turfs have been established on compacted subsoils, resulting in poor rooting, susceptibility to moisture stress and diseases and thatch accumulation. Some thatch is considered desireable, but it should be kept under control. A thatch layer of 1/2-inch or less is generally considered acceptable. In addition, excessive traffic or poor construction techniques have caused serious compaction problems.

This study was established in September, 1987 to evaluate the effect of several cultivation programs on the amount of thatch found in this Ram I Kentucky bluegrass turf. The turf was established in 1980. Treatments include cultivation (1/2-inch tines) once annually in the fall with one of the following: 1) Verti-Drain, hollow tines (4-inch spacing); 2) Verti-Drain, solid tines; 3) Core Master, hollow tines (2 by 4-inch spacing); 4) Toro Greens aerifier, hollow tines (3-inch spacing); 5) Toro, used spring and fall; 6) Toro, used spring, summer and fall; 7) a fall coring treatment reaching to 1 inch depth only; and 8) an untreated check.

To date, there have been no consistent, significant effects on turf quality. Visual observation of soil cores from the plots reveals that those treatments which bring more soil to the surface give greater dilution of the thatch with soil. Additionally, the thatch layer is less well defined in treated plots than in the check. Quantitative data will be given on the amount of organic matter found in soil cores removed from the plots.

The first step in control of thatch is to determine why thatch is accumulating. Is it a result of one or a combination of the following: an aggressive, thatch forming grass cultivar: poor management practices, such as overwatering; a poorly drained site; or compacted soil conditions, causing the majority of the roots to grow in the thatch layer, thereby increasing the rate thatch accumulates? Faulty management practices should be corrected first, then attack the thatch with cultivation. For golf greens or some athletic fields, topdressing can also be used.

Cultivation aids in thatch control by: 1) loosening the soil, thus encouraging roots to grow into the soil rather than in the thatch layer: and 2) bringing soil cores to the surface. The soil from these cores can be worked back into the thatch layer, which is suggested to encourage greater biological activity, supposedly enhancing thatch degradation. This is the theory, but there is limited data to substantiate this. The second means by which thatch control is effected is by the removal of the thatch with the soil core. On golf course greens this thatch is removed from the site, but on most other turfs it remains on the turf. While this may be somewhat effective in dealing with that portion of thatch which has been removed, it is a very small amount of the total turf area. For example, an aerifier with 3/4-inch tines (i.d.) and a 6 by 6-inch tine spacing removes just over 1% of the thatch (see table). Clearly, thatch control is a long-term program on a thatchy site.

Effect of tine size and spacing on percent of turf area affected

Tine diameter (inch)	Percent of area affected (spacing) 2" by 2"	3" by 3"	4" by 4"	6" by 6"
1/2	4.9	2.2	1.2	0.6
5/	7.7	3.4	1.9	0.9
3/4	11.0	4.9	2.7	1.2
1.0	19.6	8.7	4.9	2.2

An effective cultivation tool can be used to relieve compaction problems with a long erm program. From our cultivation research studies here at M.S.U., we know that once soil is compacted, it is not easy to correct the situation. If a serious soil compaction problem exists, a more intensive cultivation program will be needed. The more traffic a site receives the more cultivations will be needed. For example, athletic fields, band practice fields or parks and other grounds which receive heavy traffic may need more than one cultivation annually.

There is great variability in the types of aerifiers available to the turf manager. Some of very effective, some are pretty ineffective, many are in between. The first step in selecting equipment is to determine the problem(s) which exists on a given turf: thatch and/or compaction. To deal with thatch, it is important to bring a significant amount of soil to the surface; however, not so much that the turf is shaded excessively by soil cores. For compaction, a tool which loosens the soil effectively is needed. We suggest coring so that there is a hole about every 3 inches if using 1/2-inch tines. For smaller tines or wider tine spacings, use more passes to accomplish the same goal. On sites where there is a serious thatch problem, 2 or 3 treatments may be needed annually.

LAF 6

Necrotic Ring Spot Management

J.M. Vargas
Botany and Plant Pathology

Kentucky bluegrass (Poa pratensis L.) is frequently the turf species of choice for home lawns, athletic fields, parks, etc in temperate areas of the United States. Blends of the newer, improved bluegrass cultivars are generally well adapted to these moderate to high maintenance uses. The patch disease known as necrotic ring spot (previously known as Fusarium blight), however, is a persistent, and potentially devastating problem on many Kentucky bluegrass turfs. The disease is generally most severe in instances where bluegrass sod has been laid on a poorly prepared, compacted sub-soil base. In such situations, the disease may appear as early as the first year of establishment and persist for a decade or more. It can also develop in well established, seeded turf stand, although it generally develops more slowly.

The fungus (Leptospahaeria korrae) attacks the roots and crowns of the plant, inhibiting the plants ability to absorb and transport water and nutrients form the roots to the leaves. Macro-symptoms generally include dead spots and "frog-eye" patches (3" - 18" rings of dead grass with green centers) and serpentine lines and streaks of dead grass. Red or purple leaves may be interspersed with the dead leaves within these symptoms. These patches and streaks are deep and may be perennial, especially in low maintenance turfs. Under such circumstances, the patch centers are generally colonized by weeds and annual bluegrass.

Satisfactory management of this disease generally involves incorporation of certain management practices and, possibly, fungicide applications into the turf maintenance program. Studies are currently being conducted at MSU with slow-release fertilizers (Ringer Turf Restore, Sustane, etc.) applied at 1 lb. actual nitrogen/1000 ft^2/Mo. to sites with a past history of necrotic ring spot. Previous research has shown these materials to be useful in controlling symptom development, especially when combined with mid-afternoon syringe irrigation applications. Other beneficial cultural practices include thatch control and root promotion through core aerification and proper nutritional balance and availability, based on soil test.

In highly maintained, high visibility areas where disease pressure is severe, it may be necessary to combine fungicide applications with the previously discussed cultural practices in order to achieve satisfactory management of this disease. Studies are being conducted with the standard systemic fungicides (Chipco 26019, Rubigan, Banner) which provide the best management of this disease, as well as with a number of promising experimental fungicides. These compounds are being applied monthly from mid-summer to early fall in order to limit new disease outbreaks which frequently occur in the September to November period.

LAF 7

Correct Identification Vital to Mole Damage Control

Glen R. Dudderar
Fisheries and Wildlife

Field Day Presenter: Dale Elshoff
USDA Animal Damage Control Division

Correct identification is vital to mole damage control. Both species of Michigan moles have large shovel-like front feet with long claws. The eastern mole has a naked red nose and a short tail; the star-nosed mole has a large red nose with 22 finger-like projections and a long tail. The eastern mole usually makes many shallow tunnels that raise the soil into long winding 2 inch high ridges. The few mounds it makes are low, rounded and often have bits of turf on them. It prefers well drained soils. The star-nosed mole usually makes deep tunnels not evident on the surface, but it pushes up soil from these funnels into many conical mounds of raw earth. Some mounds may be more than 6 inches high and 12 inches wide. It prefers moist soils. The pattern of tunnels and hills made by both moles varies with soil conditions.

Moles frequently cause damage, but are also beneficial as they are insectivores that feed on insects, worms, and other invertebrates. They also irrigate and aerate the soil by burrowing. Occasionally they eat plant seed, roots, and bulbs, but most damage is done while burrowing for insects when they uproot the plants and grass roots. They are most active in spring or fall, on cloudy days and following rainy periods during the summer. During winter and midsummer dry conditions they go deep into the ground. They have a very extensive underground tunnel system, including travel tunnels (which are used daily) and foraging tunnels (rarely re-used). When moles become a problem, the following methods can be used to control the damage.

1. **Direct Killing-** Although eastern moles may burrow at any time, they are usually most active at certain times, depending on the season. Note when most new activity occurs, or when flattened ridges or mounds are repaired. Once you have determined when the eastern moles are most active, lost during those times to see the long winding ridges being pushed up by the eastern mole tunneling just below the surface of the ground. With practice you can quickly and quietly approach the tunneling mole and kill it by smashing the earth down with a shovel or similar instrument just behind where the earth is being lifted up. Repeated application of this method can gradually remove eastern moles from an area. This method rarely works for the starnosed mole because it usually burrows too deeply.

2. **Trapping-** Eastern moles are easy to trap provided that the trap is placed on a tunnel that is actively being used every day and that problems with function of the trap are noted and resolved. Locate active tunnels of eastern moles by gently mashing a short section of every ridge that you can find with your foot and marking it in some way. Any ridge that has been pushed back up with 12 to 13 hours is over an active tunnel. Traps placed on these ridges should catch a mole every 24 to 48 hours until all using the tunnel beneath are caught. If a trap hasn't caught a mole in 3 days, it is in the wrong location, or it has caught all the moles using that particular tunnel and should be moved to a new location.

Of the three types of traps, the choker type seems to be the easiest for most people to use successfully on the eastern mole. In heavy clay soils, the frame of the harpoon trap will sometimes rise up out of the ground rather than impale the moles. If this happens, use pieces of wood or metal to stake the trap to the ground. With all types of traps, work the harpoons or jaws of the trap back and forth or up and down through the soil to ensure smooth penetration of the soil. If any trap is sprung prematurely so that the mole is not caught, remove a small piece of sod from under the trigger pan so as to delay the action of the trap. If moles burrow around a trap, then either the soil has been flattened too tightly, or par of the trap is projecting into the tunnel and alarming the mole.

To trap star-nosed moles, locate active tunnels of starnosed moles by scattering the soil of each mound until it is flat. Mounds that are pushed back up in 24-48 hours are over active tunnels. To set the trap it is necessary to dig a hole beneath one of the mounds of earth. The hole should extend to the bottom of the mole's tunnel, usually 4 to 6 inches below the surface of the ground. Refill the hole with enough earth to cover the top of the mole's tunnel with approximately 2 inches of earth. Set the harpoon type trap in the hole.

3. Reduction of the moles food supply- Moles feed on earthworms, insect larvae, and other invertebrates. The use of insecticides to reduce insects and related invertebrates may eliminate enough of the mole's food supply, especially in sandy or light soils, so that they either starve or move elsewhere. In clay and organic soils, earthworms are usually abundant enough to make insecticide application ineffective.

4. Poison baiting- Poison baits for moles that contain 2% zinc phosphide can be used to control moles. Place teaspoon quantities every 10-15 feet along mole travel tunnels. To place the bait in the tunnel, punch a hold in the tunnel roof with a 1/2 inch wood or metal rod. Pour the bait through the hole into the tunnel and then repair the hole with a piece of sod or wadded newspaper. Repeat treatment weekly until mole activity ceases. **Caution: Zinc Phosphide is TOXIC to birds and mammals. USE WITH CAUTION.**

Restricted Use Materials:

Fumigant- These products produce TOXIC gases in the mole tunnels: USE WITH CAUTION.

5. Calcium cyanide- locate active tunnels and use a duster to blow calcium cyanide into the tunnels in both directions every 5-10 yards. Seal openings. Two to three pumps on the duster are sufficient. Note: Calcium cyanide may kill the roots of plants in the tunnels.

6. Aluminum phosphide (Phostoxin)- locate active tunnels and place a tablet into all the tunnels every 5-15 yards during the afternoon and evening. Use as many tablets as necessary to obtain complete coverage of the entire mole system, not just the tunnels in one area, such as a yard. If the first treatment is not successful, repeat treatments eventually are. **Do not use within 15 feet of any building. Keep lid on container tightly fastened at all time.**

Experimental Materials

Several products are now being tested. Check with your County Extension Agent for current status.

LAF 8

World Cup Research Project for Pontiac Silverdome

J. N. Rogers, III, P. E. Rieke, J. C. Stier, and T. J. Lawson
Crop and Soil Sciences

When International Soccer's governing body, FIFA, decided to host the 1994 World Cup Games in the United States for the first time, they made soccer history. When they chose the Pontiac Silverdome as one of the 9 venues for the games, they made sports history. FIFA rules state that all World Cup matches must be played on natural turf. Therefore in order for the World Cup matches to be played in the Silverdome natural grass must be placed inside the dome, a feat never before attempted. When the Michigan Bid committee (now the Michigan Host committee) asked the MSU turfgrass research team to become involved in this colossal task, we agreed on the condition that funding be provided to research the problems facing this kind of operation.

The first order of business was to hire a research technician, John Stier, to oversee the day to day operations. John has a M.S. in plant pathology from the Ohio State University, and is already performing brilliantly. He is assisted by T. J. Lawson, a 1992 Two-year graduate and current B.S. student. The second order of business was to conduct an environmental study inside the Silverdome from mid-June through early August. In this study we have been monitoring the effects of growth regulators and supplemental lighting on perennial ryegrass and Kentucky bluegrass. Because of the events schedule in the Silverdome, continuance of this study and logistical studies throughout the fall and winter was prohibitive. Couple this with the mandate from FIFA to host a practice game in June 1993, and the only feasible way to obtain answers to the remaining and future questions was to build a domed facility at the Hancock Turfgrass Research Center on the MSU campus. This dome is being built to as closely simulate the environmental conditions in the Pontiac Silverdome as possible, particularly that of the light. The construction of this dome will allow us to continue research uninterrupted until the completion of the World Cup games in June 1994.

Plans for this fall include a study to investigate rooting potential under the various light conditions as well as studies involving various module shapes and sizes. With the scheduling of the practice game in 1993 it is imperative that we answer questions along these lines during the fall and winter months of 1992-1993 so to be prepared for the implementation of the field in Spring 1993.

The funding for this research is coming from the State of Michigan, the Michigan World Cup Host Committee, the Pontiac Silverdome, and Michigan State University. All of these parties are committed to the success of this project the culmination of which will be four soccer games played from June 17 - 30 that will generate an estimated 120 million dollars in the Pontiac area. The real pleasure in working in this project is watching our industry come to the front and offer their assistance. Already we have been assisted by too many to mention everyone in this paper, but it is truly gratifying and reassuring to see the industry rally around a project that is this historical as well as harrowing. To this we say thank you both for the past as well as the future.