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**T**oo much — too little — too late — These are the three big moisture problems which must be solved to acquire healthy plants through proper root structure.

As an irrigation contractor for over 13 years, Irrigation Supply has installed a great number of sprinkling systems to correct the latter two problems in lawns, shrub bed areas, cemeteries, golf courses, baseball and football fields, and wherever the lack of moisture was the basic problem. After some years, it became apparent that the first problem — too much — was far more important and of greater concern than the combination of the other two.

The supplying of adequate moisture to dry areas is purely academic and can be resolved by installing an engineered sprinkling system. However, the residual water from sprinkling, often supplemented by rainfall, will find isolated low areas and proper drainage of those areas must be provided if the plants are to survive.

Through a vast amount of research, plus trial and error with a

large number of differing sizes and styles of drainage systems, we determined that a one inch plastic pipe, with quarter inch holes drilled every 6 inches throughout the length, was part of the answer to this problem. We designed the tools with which to install this pipe and have made a multitude of installations during these past five years.

The vibratory plow, which we designed to pull the pipe through the soil at the desired depth of from 4 to 7 inches, is hydraulically controlled to conform to the contour of the terrain and achieve proper drainage. The right depth is determined by sampling to learn the composition of the soil and root structure.

The plow, attached to the machine by a cutter shaft, is hydraulically inserted into the soil to the desired depth before it is caused

to vibrate. This vibration compacts a one and a half inch tunnel into which the pipe is pulled by a 'Chinese Finger' attached to a hook on the plow, and it also shatters the soil to a radius of several feet from the plow.

On the surface, the only visible evidence of the installation is a small cut, approximately a quarter inch wide which will disappear after several waterings. But if immediate use without visible evidence of the installation is desired, the small slit can be dressed with coarse silica sand or other material.

One installation of interest might be the 13th green on the golf course of the Chagrin Valley Country Club. This green is in front of and at the base of a cliff-like rock area from which water would weep for several days following a heavy rainfall. During such periods, the green was either out of play or used only by those who were seriously devoted to the pleasures of golf.

Many plans to correct the problem were considered and discarded, since trenching and installation of conventional drain tile

## **A PULLED PIPE SYSTEM FOR DRAINAGE**

would have required several days. Instant Drainage was suggested and adopted.

Installation was started at 10 a.m. and just three and a half hours later the green was back in play. It has not been out of play since then due to excess water.

The initial root structure was measured at two and a half inches, and just three months later had deepened to four and three quarter inches. We have subsequently and successfully drained fairways and other problem areas on their course.

We have designed various attachments for our vibratory plows to enable the installation of the one inch pipe with a minimum of lawn damage and without digging. By using this size of pipe, we avoid mounding and install it to whatever depth is dictated by the desired root structure, usually just where the topsoil joins the clay or other subsurface material.

Not only does this drain off the

excess surface, water, instantly, but it also aids in the aerification of the soil, and it retards the compaction of the surface in heavily traveled wet areas. In addition, although the pipe has a positive siphonic action, it still retains enough subsurface moisture for root consumption as needed, thus making for a deeper and heavier root structure and healthier plants.

The twenty foot long sections of pipe are permanently bonded together to form whatever continuous lengths are required. We can pull a thousand feet of continuous length in compatible soil, and have installed 5,000 feet of pipe in a day using one machine and an operator.

Over a given area, we will install a greater quantity of Instant Drainage than is normal with four inch pipe, and this permits a greater percolation of water through the soil. Wet areas in which we have compacted tunnels only, without the installation of pipe, have retained

their inch and a half of compacted tunneling for several years.

Examination of 5-year-old installations of Instant Drainage reveals that the pipe is still clean, free of debris, and functioning well. Installation in sandy soil assures that soluble salts in the air can be washed away from the root structure of the grass and/or plants and thereby provide stronger growth.

We recently installed 20,000 feet of Instant Drainage at Cleveland Stadium, which has four season use as the home of a football and a baseball team. The field of this stadium is reportedly fifteen feet below grade and would remain very wet for several days after a downpour. Before the installation was completed, we were visited by a wet weekend during which almost 5 inches of rain fell throughout the area by Sunday evening. At 9 a.m. Monday morning, the field was wet, but by 1:30 p.m. that same afternoon, the field was dry. □

*Installation in progress at Cleveland Stadium.*

