many years will likely be limiting in some micronutrients. Topdressing materials can be supplemented with these nutrients and that is an effective means of application.

Other management variables can be adjusted to minimize summer decline. These include raising the mowing height, maintaining a well watered soil/sand profile to promote deep root growth, maintaining good air movement over the green and minimizing the time when there is free water on the grass. Summer stress cannot be prevented but careful fertility management can help minimize turfgrass decline.

Unseasonably dry Southeast and its effect on insect damage

Q: How much of a role do unseasonably dry soil conditions in spring — like those that are occurring this year in the Southeast — play later in turf-damaging insect activity?

A: Dr. Rick Brandenburg, North Carolina State University, replies: Dry weather in the spring can affect turfgrass insect damage in several ways. There can be a short-term effect in which the dry conditions enhance the effects of the insect feeding, simply due to the fact that the drought is providing an additional stress to the plant.

Turfgrass damaged by white grubs will show much more serious symptoms of injury if the grass is under drought conditions. Dry weather will usually slow turfgrass recovery once the pests have been controlled.

This can be true for surface feeding pests such as armyworms as well. Dry weather may increase the chance of seeing armyworms on highly managed turfgrass since the armyworms will "move" from areas where the grass is dry from the drought into lush, green irrigated areas.

Some pests, such as bermudagrass mites and southern chinch bugs, usually are more severe during hot dry conditions. The rapid increase of their populations is enhanced under such conditions and the interaction of the pest and the weather often has devastating effects on the turfgrass.

In a few instances, dry weather may reduce the likelihood of a pest problem. This would be true in the case of black cutworms.

Long-term effects of dry weather may result in a reduction in certain pests such as mole crickets or white grubs. This is because the adults prefer to lay eggs in areas with adequate soil moisture to ensure egg viability and hatch. Dry soils often result in eggs that desiccate and, as a result, potential insect problems never materialize.

These are general observations and such trends, while valuable in planning, are not a substitute for a good monitoring program of the turfgrass.

Both gray snow mold and pink snow mold can severely disfigure turf stands of cool-season grasses.

Gray snow mold vs. pink snow mold

Q: How can I differentiate between gray snow mold (GSM) and pink snow mold (PSM) damage and what should I do to help the turf recover if I have either disease?

A: Dr. Noel Jackson, University of Rhode Island, recommends: Both GSM and PSM can severely disfigure turf stands of cool-season grasses. Symptoms of the diseases are apparent at snow melt especially after long periods of persistent, deep snow cover. Snow accumulating over unfrozen ground offers ideal conditions for these psychrophilic (cold tolerant) fungi to take advantage of the dormant turf and generate the typical symptoms. Yellow to bleached, collapsed grass plants in patches from 1 to 2 inches up to 1 to 2 feet mark the infection sites. Patches may coalesce to involve large areas of turf.

Close mown stands of bentgrasses, bluegrasses, fescues and perennial ryegrasses on greens tees and fairways are particularly vulnerable, but all kinds of sports turf and lawns can support infections by these fungi.

The names imply that color differences (in mycelium and/or colonized plant tissues) may be used to differentiate between these snow molds but often such visual dis-

tinctions are hard to assess. Positive identification of the causal agents, Typhula spp. (GSM) and Microdochium nivale (PSM), is reliably determined by examination for the resting structures of GSM (visible with a hand lens or naked eye) and for the asexual fruiting structures and spores of PSM (visible with a hand lens and microscope respectively).

GSM resting structures (sclerotia) are rounded, reddish brown to black masses of densely compacted mycelium ranging in size commonly between 0.5-2 mm diameter. They form on or in the collapsed plant tissues and serve to carry these fungi through the season into the late fall when active growth resumes.

Pink snow mold has the capacity to continue activity without snow cover — provided weather conditions remain cool and wet. Existing patches may continue to increase in size and spore inoculum from these sites may spread.

Collapsed plant tissues of PSM often have a pinkish coloration. Examination of such material with a hand lens may reveal the cream to orange-colored slimy pustules (sporodochia) of M. nivale. Transfer of a small sample from the sporodochium to a water drop on a glass slide and viewed through a compound microscope will readily demonstrate a profusion of the characteristically small, banana-shaped spores.

By snow melt, GSM activity ceases. No fun-gicide treatment is necessary at this time but the dormant sclerotia remain in the thatch layer. Generally, GSM damage is confined to the leaf blades and sheaths, the crowns remaining viable so natural but delayed recovery of the turf will occur. Light scarifying to remove crusted leaf debris followed by judicious topdressing and/or fertilizer application will enhance the recovery process.

In contrast, PSM has the capacity to continue activity without snow cover — provided weather conditions remain cool and wet. Existing patches may continue to increase in size and spore inoculum from these sites will be tracked to initiate new infections.

The spring phase of the disease, commonly referred to as Microdochium (Fusarium) Patch (M/FP), can reach epidemic proportions and, depending on location and weather conditions, continue activity as late as June.

Cool, wet weather in late summer and fall is also very conducive to M/FP outbreaks, particularly on Poa annua and bentgrass turf that is lush and succulent from excessive nitrogen fertilization. If not treated at that time, existing MF/P patch symptoms may then be subject to early snow cover, setting the stage for severe PSM damage over the winter.

Microdochium nivale is usually a much more damaging pathogen resulting in death of most crowns and allowing little recovery growth. Thus, treatment with a fungicide at snow melt for PSM infected turf is strongly recommended to prevent any extended spring activity in the MFP phase. Depending on weather conditions, repeat fungicide applications may be necessary.

Dicarboximide, benzimidazole, DMI or strobilurin fungicides all offer good control. Quintozene, a common fall-applied preventive material, should not be used in spring if temperatures of 65-70 degrees Fahrenheit are anticipated since phytotoxicity to bentgrass turf is possible with this material.