Health and Safety

In the last *FNN* issue, we looked at a couple of health problems associated with nursery work: the fungal disease sporotrichosis, and repetitive motion injuries like carpal tunnel syndrome. Because there was so much interest, we decided to feature these two ailments at last summer's meeting of the Western Forest and Conservation Nursery Association meeting. I've summarized the highlights of those presentations in the following sections. If you would like to order the entire articles, I've included their FNN order number after the citation at the end of this section.

The Latest on Sporotrichosis

This rather rare skin disease is caused by a fungus *Sporothrix schenckii* which is found in many types of organic materials. The most common cause of nursery-related infections, however, is Sphagnum peat moss. Nursery workers are exposed when raw Sphagnum moss is used as a moisture-holding medium around the roots of bareroot seedlings during lifting and packing, container nursery workers use Sphagnum-based growing media, and tree planters are also exposed during outplanting.

The fungus.

S. schenckii is worldwide in distribution and has been found in both temperate and tropical climates. It has been isolated from soil, humus, organic fertilizer, mushrooms, hay, bark, wood, and from many types of plants including roses, carnations, and even cacti. From a mycological standpoint, this fungus is interesting because it is dimorphic. In nature it grows as a typical mycelial fungus and produces conidia, just like

Botrytis spp. In animal tissue, however, it behaves like a yeast and reproduces by budding.

The disease.
The fungus invades the skin through puncture wounds and causes small lesions which do not respond to normal treatment (Figure 10). Left untreated, secondary lesions develop along the lymph system and can persist for years. Sporotrichosis outbreaks have occurred in the southern, eastern, and midwestern states. In 1988, the largest North American epidemic involved 84 cases in 15 states and resulted from handling and planting pine seedlings which were packed in *Sphagnum* moss and distributed from a nursery in Pennsylvania. Although the fungus has been isolated from peat-vermiculite growing media, there have been no cases of sporotrichosis associated with container nursery culture.

Prevention.
The possibility of contracting sporotrichosis can be greatly reduced by some rather simple precautions:

- Supplies of *Sphagnum* moss should be stored indoors and kept dry because warm, wet conditions encourages the proliferation of the fungus. Do not store *Sphagnum* moss from year to year.
- Disinfect the peat moss storage area, containers, and utensils after the packing season.
- Nursery workers and tree planters, especially those handling *Sphagnum* moss, should protect their hands and arms by wearing long-sleeved shirts and gloves.
- At breaks, and especially at the end of the day, workers should wash their hands and other exposed areas of the body thoroughly with a bacterial soap to prevent infection.
- Any cuts or puncture wounds should be thoroughly cleaned, treated with a disinfectant such as tincture of iodine, and bandaged. Workers should report any wounds which do not heal within a few days to their supervisor.

Figure 10. The first symptom of sporotrichosis is a small skin lesion that does not respond to normal treatment.

Diagnosis.
A positive diagnosis of sporotrichosis can be made by:

1. Direct examination. The yeast cells can be stained and identified in biopsy tissue
2. Isolation in culture. *S. schenckii* can be isolated on special media and the diagnosis is confirmed by the conversion from the mycelial form to the yeast form at 37 °C (98 °F).
3. Serology. Serological tests from skin lesions can provide a quick diagnosis of sporotrichosis but are not as useful for determining the prognosis of the disease.

Treatment.
Skin lesions respond well to orally administered potassium iodide, but its bitter taste and a variety of side effects make the treatment unpleasant. The response is also slow, and a treatment period of 6 to 12 weeks is typical. Immersing lesions in hot water or heating the infected area with pads or pocket warmers can help speed up the healing process.

Some other interesting tidbits:

- The latest outbreak of sporotrichosis was at Disney World in Florida in 1994 where workers became infected while they were constructing topiary figures made of chicken wire and covered with *Sphagnum* moss. The

combination of small puncture wounds from working with the wire and the continual contact with warm, wet peat moss provided the ideal conditions for infection.

- In Uruguay, half the known cases of sporotrichosis resulted from hunting the nine-banded armadillo (*Dasypus nevemcinctus)* which were found to be systemically infected. (The obvious take-home lesson here-the next time that you're fondling an armadillo, remember to wash your hands afterwards!)

Conclusions.

Sporotrichosis should be considered a normal occupational hazard of nursery work, and should not be used as a reason to eliminate the use of *Sphagnum* peat moss. Raw *Sphagnum* moss is an ideal packing material, and peat-vermiculite growing media will continue to be the most popular type of artificial growing media. With proper education and early treatment, sporotrichosis does not have to be a major concern in forest and conservation nurseries.

Sources:

Kenyon, E.M.; Russell, L.H.; McMurray, D.N. 1984. Isolation of *Sporothrix schenckii* from potting soil. Mycopathologia 87:128.

Padhye, A.A. 1995. Sporotrichosis - an occupational mycosis. IN: Landis, T.D.; Cregg, B. tech. coords. National proceedings, Forest and Conservation Nursery Associations. Gen. Tech. Rep. PNW-GTR-365. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 1-7.

(Order #20 on the Literature Order Form)

Coping with Repetetive Motion Injuries

Repetitive motion injuries (RMIs), also known as cumulative trauma disorders, have become epidemic in recent years. The Bureau of Labor Statistics estimates that RMIs account for about 60% of all workplace injuries, and the Occupational Safety and Health Administration (OSHA) reports that they cause more that one-third of all Workers' Compensation Costs. Many common nursery tasks, such as the pulling and wrapping of container seedlings and grading of bareroot seedlings, have resulted in such a high number of Worker's Compensation Claims that some nursery managers have decided to contract all such work.

Although carpal tunnel syndrome is the one you hear about the most, there are other RMI conditions which also cause work-related injuries. Here is a brief sketch of some common ones that develop from nursery work:

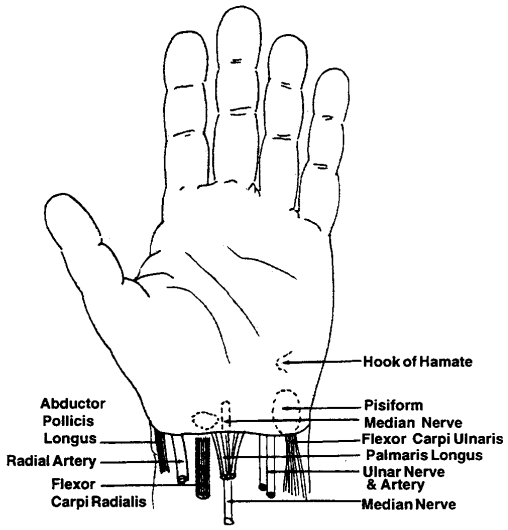

Figure 11. Carpal tunnel syndrome is a repetitive motion injury that results when the median nerve is constricted where it passes through the wrist, resulting in numbness and pain in the hand.

Carpal tunnel syndrome—an RMI that is associated with compression of the median nerve that passes through the narrow carpal tunnel in the wrist (Figure 11).

De Quervain's tendonitis—a condition involving the three tendons that move the thumb.

Lateral epicondylitis—this RMI, more commonly known as "tennis elbow", involves the tendons near the elbow.

Flexor tenosynovitis—this condition is called "trigger finger", and is caused by repeated use of the index finger.

Diagnosis.

The first step in treating RMIs is an accurate diagnosis, which requires a combination of symptoms, patient history, and diagnostic testing. Many carpal tunnel syndrome cases have been misdiagnosed in the past but there are some simple tests that can tell you if this RMI should be suspected. For example, Tinel's test involves tapping on the wrist to see if numbness radiates into the first three digits of the hand. Nerve conduction studies called electromyography can detect a slowing in the sensory conduction through the median nerve, and are widely considered to be the definitive diagnosis for carpal tunnel syndrome.

Diagnosis of RMI conditions is particularly critical because symptoms become worse with time when they remain untreated. If you are having trouble finding a doctor that is familiar with these disorders, there are several medical centers that specialize in them. For example, the Portland Hand Surgery and Rehabilitation Center (Tel: 503-227-1636 or Fax: 503-227-5722) specializes in treatment of carpal tunnel syndrome.

Prevention.

Some people are more susceptible to RMI's than others. For example, some personal characteristics such as age, wrist size, obesity, and type of off-work activities have been related to susceptibility to carpal tunnel syndrome. You can't do much about the first two, but the incidence of RMI's is much less for people who keep in good physical shape. Some specific actions that can prevent or at least lessen the incidence of RMI's include:

- Train all workers on proper technique before starting a new task, and spend extra time showing new employees how to do it properly.
- Schedule warm-up exercises each morning (Figure 12), and emphasize those that build-up shoulder, arm, and wrist muscles. Encourage workers to join fitness programs off the job.
- Rotate jobs or work stations whenever possible. For example, rotate workers through the "pulling" station when processing container seedlings, or avoid using vibrating equipment such as electric shears, for more than 2 hours at a time.

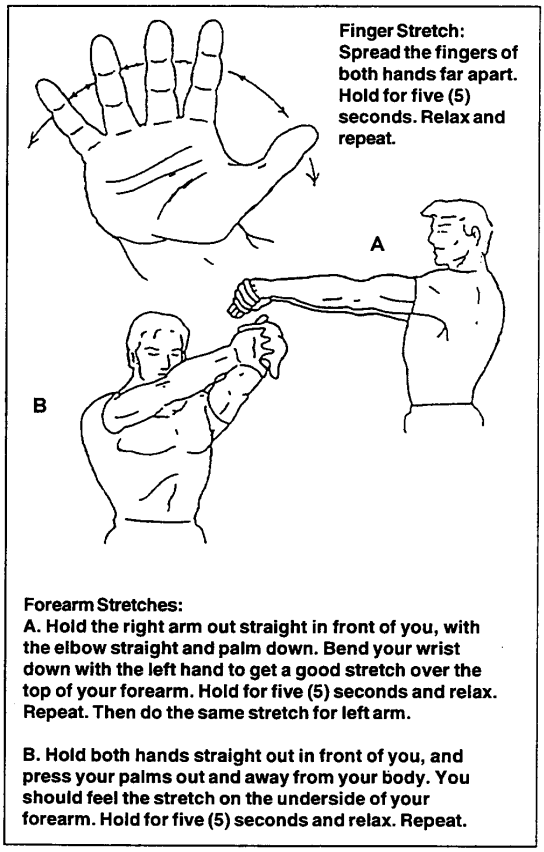

Figure 12. Nursery workers who keep in good physical shape and limber up with exercises before starting work each morning have less chance of suffering from repetitive motion injuries.

- Tell workers to stop at the first sign of chronic pain and inform their supervisor. Some workers just may not be able to do certain tasks.
- Emphasize correct posture and technique and vary physical position when performing repetitive tasks. Try to grasp rather than pinch and keep the thumb in the neutral position. When using tools, wrap the thumb around the handle instead of holding it lengthwise along it.
- Switch to new ergonomically-designed tools that conform to the hand. Tool handles are being redesigned relative to their diameter, attachment angles, and many feature anti-slip coatings, finger grips, and cushioned coverings.
- Dress warmly and use gloves in cold work areas such as packing sheds because cold conditions are known to aggravate RMI's.

Conclusions.

Repetitive motion injuries are a hazard of nursery work, but their incidence and impact can be significantly decreased with a few simple precautions. Create awareness at nursery safety meetings and promote prevention by regular training sessions.

Sources:

Appleton, B.L. 1995. Horticulture or Horticulture? Nursery Management & Production 11(7): 57-60,62-63. **(Order #11 on the Literature Order Form).**

Mowry, D. 1995. Current developments in the prevention and treatment of repetitive motion injuries of the Upper Extremity. IN: Landis, T.D.; Cregg, B. tech. coords. National proceedings, Forest and Conservation Nursery Associations. Gen. Tech. Rep. PNW-GTR-365. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 8-12. **(Order #6 on the Literature Order Form)**

Personal Protective Equipment

According to the EPA's Worker Protection Standard that became effective in 1995, pesticide handlers, applicators, and early entry workers are required to wear some type of personal protective equipment (PPE). The type of required PPE varies with the pesticide and the type of job; the specifics are given on the pesticide label. OSHA recently released a booklet on PPE which provides practical information such as the five conditions under which respirators must be used and the factors to be considered for selecting gloves. A single free copy of the booklet may be obtained by sending a self-addressed label to:

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