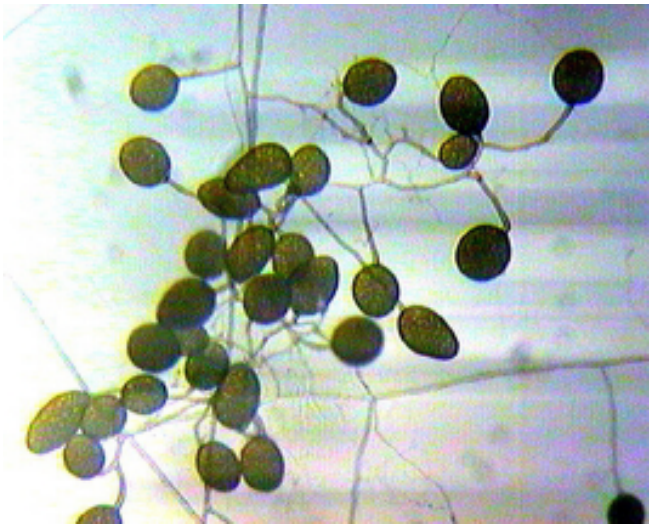

Figure 1. Spores of Glomus intraradices, a vesicular-arbuscular mycorrhizal fungus (VAM). Photo from the Mycorrhiza Information Exchange Web site: http://mycorrhiza.ag.utk.edu/

Survey of Commercial Sources of Mycorrhiza Inocula for Horticultural Use

Richard Y. Evans and Seanain Snow

Endomycorrhizal fungi, or vesicular-arbuscular mycorrhizae (VAM), are known to associate with a wide variety of plant species in a mutually beneficial manner. In this symbiosis, plants gain greater amounts of water and nutrients and the fungi gain the photosynthates that plants provide. Mycorrhizae occur on the roots of many species of horticultural plants. They may improve the growth of the host plant through increased uptake of some mineral elements, most notably phosphorus and zinc, increased tolerance of drought, and decreased susceptibility of plants to soil-borne pathogens (Maronek et al. 1981). They may also improve transplant survival and rate of plant establishment after transplanting (Barrows and Roncadori 1977, Cooper 1981). Inoculation of container media with ectomycorrhizae is used commercially in the production of conifers for reforestation (Trappe 1977), and there is resurgent interest in use of mycorrhizae (especially vesicular-arbuscular mycorrhizae, or VAM) in container production of plants for landscapes and restoration projects.

Although evidence of the value of mycorrhizae in horticulture is encouraging (Brundrett et al. 1996), much of the information about the utility of VAM for landscape and restoration sites is anecdotal. Complicating the situation is the likelihood that commercial sources of inoculum vary greatly in both the number of spores or propagules present and in their viability.

There is an abundance of commercially available VAM inocula. The commercial sources vary greatly in the carrier medium, the number of species claimed to be present, and the "dosage" or the number of active spores per unit weight or volume. The purpose of this project was to compare some of these commercial sources and determine whether or not they meet the spore counts indicated on the product labels.

Materials and Methods

Four commercial preparations of VAM inocula were chosen from a list of 25 sources and purchased without disclosing their intended use. For inocula provided in soil or other solid matrices, the matrix was suspended in water, then washed and decanted through a series of sieves until the water was clear. Roots and coarse material were collected on a 1 mm screen, and spores were collected on finer screens (to 45 µm). The spores and water were centrifuged, re-suspended in a sucrose solution and then re-centrifuged. The sucrose solution facilitated separation of spores and debris with spores rising to the top of the suspension. The supernatant was washed and filtered to remove sucrose and capture spores. The spores were placed in Petri dishes for counting. This procedure was performed in three separate trials for each of four different commercial inocula sources.

Results

Two of the inocula were found to contain significantly fewer spores and two had significantly more spores than were indicated on the product labels (Table 1). This range is what might be expected for an industry that is new and growing, in which the technical expertise of the producers varies greatly.

It is difficult for the average horticulturist to evaluate directly the success of mycorrhizal inoculation, and many would rely on anecdotal information from others with experience using mycorrhizae. It is important that users begin with reliable inocula, so that evidence of the success or failure of their use is based on performance in the landscape or container. Information about the reliability of commercial sources of

Table 1. Actual spore counts compared to label claims for four commercial mycorrhizal inocula.

Inoculum	Trial 1	Trial 2	Trial 3	Average number of spores per trial	Number of spores on product label
1	8072	10404	10548	9675 in 12 mL	900 in 12 mL (75 spores/mL)
2	2715	2517	1619	2284 in 7 mL	399 in 7 mL (57 spores/mL)
3	198	281	319	266 in 13 mL	1300 propagules in 13 mL (100 propagules/mL)
4	62	219	334	205 in 10 grams	2000 spores in 10 grams (200 spores/gram)

mycorrhizal inocula would be of value to horticulturists involved in growing plants for either commercial or private purposes. It may have a particularly important impact on restoration and revegetation projects, where use of mycorrhizae is increasing rapidly. In addition, awareness of differences in quality of inocula may spur the commercial sources on to greater reliability.

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