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From Forest Nursery Notes, Winter 2012

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Processed Corncob as an Alternative to Perlite in the Production of Greenhouse Grown Annuals^{©1}

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INTRODUCTION

Topsoil was used in container plants in the greenhouse and nursery industry until the 1960s when new soilless substrate alternatives were developed. One of the pioneers in this new soilless substrate was Cornell University with their peat-lite mixes. The peat-lite mix was a combination of peatmoss, used for its fine particles to hold water, and perlite and vermiculite were used to create air spaces in the substrate (Boodle and Sheldrake, 1977). Peatmoss is derived from the decomposition of mosses, sedges and sphagnum's under acidic and wet conditions (Bunt, 1987). Vermiculite, an aluminum-iron-magnesium silicate is produced by heating the rock to 1,000 °C (Bunt, 1987). Perlite an igneous glassy rock that is mined and heated to 1,600 °C to remove all water and expand the rock (Moore, 1987). While perlite has no known health hazards it is considered a nuisance causing lung and eye irritation (Evans and Gachukia, 2004).

Growers are interested in alternatives to perlite that provide the same functions without the nuisance of the fine dust particles. Some of these alternatives have included pumice, parboiled rice hulls, and expanded polystyrene. Pumice is a naturally occurring mineral from aluminum silicate, potassium, and sodium oxides often developed from volcanic eruptions. When compared to perlite pumice was found to have similar chemical and physical characteristics (Noland et al., 1992).

In one study parboiled rice hulls (a byproduct of the rice milling industry) and perlite were mixed with peat at rates of 10% 15%, 20%, 25%, 30%, and 35%. In the growth of impatiens, marigold, vinca, and geranium there was no significant difference between root-dry weight and shoot-dry-weight (Evans and Gachukia, 2004).

Polystyrene beads (PSB) are a byproduct of the polystyrene industry. In a study by Cole and Dunn (2002) a substrate containing PSB was found to produce similar plants to those grown in similar mix containing perlite.

Another possible alternative to perlite is processed corncobs. Corncobs are often left over from the harvesting of corn seed and are used for many different products. There are four main parts of cob that are processed and used commercially; the three outer parts of the cob are the beeswing, chaff, and the woody ring which are considered to be the most absorbent part of the cob. These outer parts are often pelletized and used for absorbent tasks including chemical waste, oil, grease, animal bedding, and litter and sweeping compounds. The inner part of the cob is considered the pith and it is often used as an abrasive material in tasks such as sand blasting, metal finishing, polishing, and carriers for pesticides.

Corncob is a waste byproduct of the corn feed and seed industry and requires less energy to produce than perlite. Because it is a byproduct, no rise in the feed and seed market prices would be anticipated. Corncob is a product of the United States and does not have to be imported; therefore decreasing transportation cost. Because of these and other potential advantages of using corncob as a perlite alter-

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