

COMPARISON STUDIES OF BEDDING PLANTS GROWN
IN BLACK PEAT VS. SPHAGNUM MOSS PEAT
AND PERLITE VS. HAYDITE AGGREGATES

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INTRODUCTION

High quality bedding plant production depends upon a good growing medium that has proper aeration, good physical and chemical properties and is essentially disease-free. One of the more common mediums is a soil, organic material, and aggregate mixture.

Although many organic materials are available, sphagnum moss peats are most widely used. Since sphagnum moss peat is becoming scarce, Kansas bedding plant producers may have to find an alternate source of organic amendment. Domestic black peats may be a satisfactory substitute.

Aggregates used in greenhouse soil mixes range from inexpensive sharp sand and gravel to moderately expensive perlite, vermiculite, or calcined clays. Haydite is a reasonably priced calcined clay produced in Kansas that may be used as a substitute for perlite or other aggregates.

A 1:1:1 soil, peat, and aggregate mixture was used to compare all possible combinations of black peat, sphagnum moss peat, haydite, and perlite. Tomato, salvia, petunia, pepper, and ageratum seedlings were grown in the four mediums and were evaluated according to height, stem diameter, bloom date, and dry weight. Nutrient content, physical properties, and pH of the media were measured during the growing period.

LITERATURE REVIEW

Components of satisfactory bedding plant mediums fall into three categories: soil, organic matter, and coarse aggregate (12). The soil mixture recommendation by Penn State University on a volume basis for heavy soils (clay loam) is 1:1:1 soil, organic matter, and aggregate. For medium soils (silty loam), it is 2:1:1 soil, organic matter and aggregate and for light soils (sandy loam), it is 3:1:1 soil, organic matter, and aggregate. Tayama (11) states that soil, clay, silt, sand, or loam may be used satisfactorily as a bedding plant medium if corrected with amendments of organic matter such as peat, and aggregates such as perlite or calcined clay.

Numerous aggregates are available to the greenhouse growers today. Perlite is a volcanic rock product made by heating to 1800^oF. The exploded, porous material weighs 6 to 9 pounds per cubic foot and will absorb 3 to 4 times its weight in water. The calcined clays ('Turface,' 'TerraGreen,' and 'Arcillite') are aggregates used to improve the aeration of a medium. They are baked montmorillonite clays that are porous with good nutrient holding ability. The baked clay particles are highly resistant to breakdown (11). White (12) points out that calcined clay does not float to the surface of the medium as does perlite.

Among the various organic amendments available,

sphagnum moss peat has excellent nutrient and water holding capacity (1,6). Sphagnum moss peat has many chemical and physical advantages over other organic materials. It is uniform, stable to steam and fumigation, is easily mixed, has good aeration, and is adaptable to a wide range of plants with only minor modifications (1).

Peat ranges in color from light brown to black by progressive states of decomposition. Sphagnum moss peat, oven-dried, can absorb 20 to 30 times its weight in water as reported by Lucas (9). Peats are naturally low in micro-nutrients. Sphagnum moss contains 0.6 to 1.4% Nitrogen. Baled peat may contain from 21 to 49% water as reported by a U.S.D.A. survey (9).

The pH of peat is controlled by the colloidal complex. The colloidal complex saturated with H^+ ions will develop a lower pH than a similarly charged acid mineral soil. Peats contain high quantities of calcium because of the highly absorptive nature of peat and the abundance of calcium in water entering the swamps by seepage. Peats show exceedingly vigorous nitrification because of the high nitrogen to carbon ratio which is conducive to microbial activity. Phosphorus and potassium content is exceedingly low in peat soils (8).

When soil is difficult to obtain, several soil-less media might be used. The recommended University of California media for bedding plants is a 3 parts sand to 1 part sphagnum