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Growth of *Pistacia chinensis* in a Red Cedar– Amended Substrate[®]

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INTRODUCTION

Pine bark (PB) continues to be the industry standard material for container grown plant production of woody ornamentals throughout the Southeast U.S.A. (Yeager, 2007). However, because of the closing and relocation of timber mills, as well as increased use of PB as a fuel source for power mills, PB has become less available and more costly for use in the nursery industry (Laiche and Nash, 1986; Lu et al., 2006). This has led to a demand for alternative substrates to supplement PB particularly in regions that lack indigenous pine species (such as the Great Plains). Abundant tree species in the Great Plains could potentially be used in a similar manner to Clean Chip Residual (CCR) and WholeTree (WT) which have been used in the Southeast U.S.A. Eastern red cedar (*Juniperus virginiana*) grows in most areas of the Great Plains. Once held back by grazing and wild fires from fully entering the grasslands, community development and farming have reduced these natural control measures. Additionally, the use eastern red cedar as windbreaks, erosion control, and wildlife cover since the 1960s has increased the seed population (Ganguli et al., 2008; Ownesby et al., 1973).

Movement of eastern red cedar into the Great Plains can impact the environment by affecting soil moisture, blocking incoming solar radiation, decreasing soil temperature, and altering litter dynamics by increasing litter size and slowing decomposition creating a mechanical barrier that prevents germination. Even isolated trees can have a negative effect on species composition well beyond its canopy diameter affecting stem density, species richness, forb cover, and grass cover. As a tree becomes older and larger the understory environment becomes unfavorable for most herbaceous plants and rapid recovery to the original species composition (prairie) seems unlikely the longer a single tree is in place. Nonetheless tree stands full of eastern red cedar exist across the Great Plains (Linneman and Palmer, 2006; Gehring and Bragg, 1992). In addition to decreasing species diversity, eastern red cedar increases livestock handling costs and decreases forage area (Ortmann et al., 1998). In Oklahoma an estimated 762 acres of land are lost to eastern red cedar infestation per day (Drake and Todd, 2002).

Utilization of eastern red cedar chips as a component of nursery potting substrates could alleviate PB demand in the Great Plains with a sustainable, local resource while providing economic incentive to decrease the eastern red cedar population and its effect on the Great Plains ecosystem and economy. Previous work has