

Original Research Article

EFFECT OF LEAF SUN PROTECTOR ON INITIAL GROWTH *KHAYA SENEGALENSIS* UNDER WATER DEFICIT IN DIFFERENT MICROCLIMATIC CONDITIONS

Abstract

African mahogany (*Khaya senegalensis*) has been presented as an alternative for forest implantation due to its fast growth and wood properties. However, in some regions, there have been frequent reports of seedling loss or reduced initial growth as a consequence of water scarcity. A management alternative is the use of leaf sun protector, to modify the energy balance and reduce water deficit impacts. Thus, the objective of the present study was to assess the effect of applying leaf sun protector on the growth of young *Khaya senegalensis* plants submitted to water deficit in the soil under two microclimatic conditions: high and low atmospheric demand. The plants were kept under water deficit corresponding to 20% of the available water in the soil and treatments were adopted with and without calcium-based leaf sun protector inside greenhouses acclimatized with controlled temperature and relative humidity. Growth was analyzed based on values of total dry matter leaf area and specific leaf area, after three months of experimenting. Applying leaf sun protector reduced the impact of water deficit on *Khaya senegalensis* plant growth, especially in the condition of high atmospheric demand, characterized by high vapor pressure deficit and temperature values.

Keywords: African mahogany, vapor pressure deficit, air temperature

INTRODUCTION

Khaya senegalensis Desris is a species of the family Meliaceae, known as African mahogany. This species has silvicultural potential because it is a hardwood resembles the wood of the Brazilian mahogany (*Swietenia macrophylla*) for physical and mechanical properties. It is the most drought tolerant species within the genus *Khaya*, but studies have reported severe damage caused by water deficit (PINHEIRO et al., 2011).

Stress caused by water deficiency influences several processes in the plant, such as leaf and root growth, and reduces stomatal conductance, photosynthesis and dry matter (PINHEIRO et al., 2005; COLOME VAZZANA, 2001; LIBERATO et al., 2006; MARTINS et al., 2010; BALDUCCI et al., 2013; ALBUQUERQUE et al., 2013). According to Marengo and Lopes (2009), water restriction for the plant causes reduction in the net CO₂ assimilation by decreasing stomatal conductance and consequently the transpiration rate. In addition, the radiation intercepted by the leaf tends to promote leaf heating that can reach levels harmful to the plant metabolism (TAIZ; ZEIGER, 2013).

African mahogany (*Khaya senegalensis*) has been presented as alternative for forest implantation, because of its fast growth and wood properties. However, in some regions, there have been frequent reports of seedling loss or reduced initial growth, as a consequence of water shortage. A management alternative is the use of leaf sun protector to modify the energy balance and reduce the water deficit impact.

Leaf sun protectors generally consist of calcium, silicate and aluminum, that when sprayed on the adaxial surface of the leaf as a reflective film reduce the noxious effects of solar radiation, heat and water deficit (AHMED; SHAABAN; AHMED, 2011).

Thus, the objective of the present study was to assess the effect of a leaf sun protector on the growth of young African mahogany plants when submitted to water deficit into two microclimate conditions, characterized by different atmospheric demands.

MATERIAL AND METHODS

The study was carried out from October to January in acclimatized greenhouse with control of temperature and relative humidity of the air, at the Forest Meteorology and Ecophysiology Laboratory at the

✓ (AHMED et al., 2011)