I. Introduction

Rice (*Oryza sativa*) is one of the world's most important cereal crops, providing staple food for nearly one half of the population. In many developing countries, rice is the main source of food security and is intimately associated with local lifestyles and culture. With rapid increase of global population, much greater rice production is demanded. (Bao-Rong Lu, 2004). Rice production will have to increase by 65% by 2020 to cope with the estimated population growth in rice-consuming countries (IRRI 1989). Rice crop plays a significant role in Egypt's strategy for sustaining the food self-sufficiency and for increasing the export. Rice which occupies about 0.65 million hectares, produces approximately 6 million metric tons of rough rice annually (national average of about 9.9 t/ha. in 2004). Farther increase in rice production through increased yield per unit area is needed. This can be achieved through varietal improvement, optimizing cultural practices as well as controlling weeds, diseases, insects and improving productivity of saline area (RRTC, 2004). Weeds compete with crop plants for light, nutrients, water and space (Glauninger & Holzner 1982 and Kropff 1993). In rice crops worldwide, losses due to competitive effects of weeds are estimated at 10 to 15% of potential production (Smith 1983; Zoschke 1990; Baltazar & DeDatta 1992). Without weed control, yield losses have been estimated to range from 16% to 86% or even 100% (Zoschke 1990; Baltazar & DeDatta 1992; Kropff 1993).

Weeds contribute from 10-85% to rice yields losses (Labrada, 2001). In China, weeds caused from 10-20% annual yield loss or 10 million tons in 33 million (Zhang 2001). In Egypt, weeds competition is the most important yield-reducing factor (causing from 36-90%yield reduction).

Management of weeds is an integral part of crop production and management . Adequate implementation of weed management systems requires information on the major weed species as well as the biology and ecology of these weeds. *Echinochloa* species are among the most severe weed species causing problems in rice crops (Lubigan and Vega, 1971; Smith, 1983 and Rao and Moody 1987 and Hassan, 2002). Barnyardgrass (*Echinochloa crus-galli L.*) is the most important grass weed in rice (*Oryza sativa L.)* in the world (Holm *et al 1977*). Rice barnyardgrass competition varies with the type of culture (lowland-upland, deepwater or tidal wetland), methods of planting (transplanting or direct-seeding), cultivar, cultural practices, interference duration and plant densities of rice and weed (Sen. 1988, Smith 1988). It is an annual grassy weed, that grows as tall as 150 cm, adapted to wet soils, very competitive with rice, and can reduce rice yield to nil (Ampong-Nyarko and De Datta, 1991; Hassan, 1996a, and shebl 2003). Barnyardgrass interference with rice varies with crop and weed plant densities, competition duration, fertilization and height and maturity of rice cultivar (Smith, 1988 and Shebl, 2003).

The competitive advantage of barnyardgrass which is C_4 plant over rice which is C_3 plant attributed to its high photosynthetic rates and corresponding high growth rates, high potential to acclimatize to a environment ; and more efficient seed production (Kim and Moody, 1989). Barnyardgrass have low moisture requirements and higher resource (N, water, photosynthesis) use efficiencies than rice (Matsunaka, 1989; Pamplona *et al* , 1990). In Egypt, among the rice growers, barnyardgrass is known to consist of many different species of *Echinochloa crus-galli* based on panicle morphology and phonology. Three distinct species of *Echinochloa* have been identified in the six rice-growing governorates as barnyardgrass. These are (1) *Echinochloa crus-galli* (l) Beauv (barnyardgrass) , (2) *Echinochloa oryzoides* (Ard.) Fritsch (early watergrass)

and (3) *Echinochloa phyllopogon* (Stapf) Koss (late watergrass).Hassan and Rao, (1993,1994b). Both watergrass are rice mimics . *E. phyllopogon* also known as *E. oryzicola* Vasing (Bayer and Hill, 1992). *Echinochloa crus-galli* and *Echinochloa oryzoides* had similar growth habit, height and leaf characteristics at the seedling stage but *Echinochloa oryzoides* was distinguished by base culm diameter, leaf width and leaf angle .Distinct differences among *Echinochloa spp.* were measured in morphological characteristics at the late mature growth stage . *Echinochloa oryzicola* was distinguished by increased height , later heading date, longer life cycle awnless spikelets, and larger length of empty glumes compared with the other two species. *E. crus-galli* and *E. oryzoides* mature early and the caryopses usually have shattered from the panicle by rice harvest and remain in the field whereas the largest proportion of *E. phyllopogon* seed occurs with the crop seed (Radosevich and Holt, 1984).

The objective of this investigation was to :

Study the effect of some cultural practices on growth of barnyardgrass and its inter and intraspecific competition with rice .