

Variety and Planting Date Effects on the Incidence of Bollworms and Insect Sucking Pests of Cotton (*Gossypium hirsutum* L.)

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ABSTRACT

Cotton is a major foreign currency earner in Zimbabwe. It is attacked by many insect pests which limit its productivity. A trial carried out at the Cotton Research Institute investigated the effects of planting date and cotton variety on the incidence of bollworms and insect sucking pests of cotton. Three varieties SZ 9314, CRI MS1 and CRI MS2 were planted on three different dates (20 October, 17 November and 15 December), representing early, mid-season and late planting times. Scouting for pests commenced from the fifth week after emergence to 10% boll split. Both planting date ($p = 0.027$) and cotton variety ($p = 0.012$) had significant effects on pest incidence. Early planted cotton had lower aphids, jassids and red bollworm population than later-planted cotton. This was due to the higher natural enemies' population and the effects of the "closed season" in the early crop. CRI MS2 hosted significantly lower populations of aphids, jassids and red bollworms compared to the other varieties. There was interaction between planting date and variety, with early-planted CRI MS2 hosting the lowest populations of aphids and red bollworms. The study concluded that early planting resulted in lower incidence of insect sucking pests and recommended the early planting of CRI MS2.

Key words: Cotton, Bollworms, Variety, Economic threshold level, Incidence

Cotton (*Gossypium hirsutum* L.) commonly called the white gold is one of the most economically viable crops in Zimbabwe. For example, in the 2004-05 farming season, the country earned US\$150 million from cotton exports, mainly to Europe and the Far East (Chingono 2006). This was about 15% of agricultural export earnings. Besides being exported, a substantial proportion of the crop is utilized by the local textile industry in the manufacture of garments and fabrics. Seed by-products are also of major significance, with cottonseed oil used locally as cooking oil and the seed cake forming a major part of ruminant stock feed. As a cash crop, cotton has played an important role in improving the livelihoods of smallholder farmers in low rainfall areas of Zimbabwe. However, yields of cotton remain low despite efforts to promote proper commercial cultivation of the crop, with the national average being about 860 kg/ha (Anonymous 1993-94). One major challenge faced by cotton farmers is the high pest incidence which occurs at virtually all stages of crop growth. According to Matthews and Tunstall (1994), there are 1326 species of insect pests on cotton, though most cause little or no economic damage. Pests that attack reproductive structures cause about 80% of the damage in cotton (Pedigo 2004). Jassids (*Empoasca fabae*) remain the principal pests in Zimbabwe (Matthews 1989), while *Heliothis* (*Helicoverpa armigera*), red bollworm (*Diparopsis castanea*), *Tetranychus* spp, *Dysdercus* spp, whitefly (*Bemisia tabaci*) and aphids (*Aphis gossypii*) also cause significant yield losses (Jowah 1994).

Currently, cotton pest control is dominated by synthetic chemical use based on pest scouting and pre-determined action levels. This has resulted in the overuse of these pesticides, leading to the killing of natural enemies and the development of resistance. A number of cultural practices like early planting, crop rotation, use of resistant cultivars, proper fertilizer application and proper plant spacing (Matthews and Turnstall 1994) can be used in place of synthetic pesticides. Many of these practices were overlooked in preference to the effective and easy-to-use pesticides. But there is now increasing concern about the adverse effects of pesticides on the environment. In Zimbabwe, the earliest dates for planting cotton are controlled by legislation necessitated by the need to maintain a specific "dead period" or "closed season" for the control of the pink bollworm (*Pectinophora gossypiella*) (Anonymous 2006). Generally, cotton should not be planted earlier than 20 October because there is a risk of damage to mature cotton by late rains that fall in late March or early April. Planting excessively earlier than this date has no yield advantages (Mashavira 1993). Cotton varieties produced by the Cotton Research Institute (CRI) are bred for resistance to pests, including jassids and bollworms. The objectives of this study were to: (1) establish optimum planting dates for new cotton varieties (CRI MS1 and CRI MS2), and (2) test the new varieties for susceptibility to infestation by aphids, jassids, whiteflies, heliothis and red bollworms.