THERMOSENSITIVE GENIC MALE STERILE (TGMS) - BASED HYBRID RICE SEED PRODUCTION (HRSP) : THE DAVAO DEL SUR EXPERIENCE

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ABSTRACT

Trials on thermosensitive genic male sterile (TGMS) - based hybrid rice seed production or the two-line system in Davao del Sur for two cropping (May 2011-March 2012) were conducted in Digos and Magsaysay, Davao del Sur. The trial aimed to establish seeding intervals to synchronize flowering of seed parent (S) and pollen parent (P) and to identify male sterile environment (MSE).

Based on experience, seeding intervals of 4-4-4 (S seeded on day 1, P1 on day 5 and P2 on day 9) P Plants flower ahead (7 days) than S plants. Increasing seeding intervals of 5-5-5 both for wet and dry season is recommended.

Digos City is identified male sterile environment (MSE) as shown by F1 (M19) produced during the first trial (May-October 2011-WS) yielded (8 t/ha) at Hagonoy, Davao del Sur (November 2011-March 2012-DS). The yield of the F1 commercially planted indicates that no selfing happened on S plant. Digos City and Magsaysay, Davao del Sur has a male sterile environment for S plants; hence seed production using TGMS is viable.

INTRODUCTION

Hybrid Rice Program in the Philippines had been launched in 1998 under the Department of Agriculture as one of the technologies foreseen to give a major contribution in meeting the rice demands of the society by increasing yield per unit area per unit time (De Leon *et al*, 2003 as cited by Agudera, 2007).

To date, 30 hybrids have been released by the National Seed Industry Council (NSIC); 12 are public hybrids developed by IRRI, PhilRice and UPLB and two (2) are TGMS- based: the NSIC Rc 202H or Mestizo 19 and NSIC Rc 204H or Mestizo 20 (Sajise, 2011). Average yield (t/ha) of 6.7, 6.4 ; maximum yield (t/ha) 10.7, 11.7; plant height 108 cm,112 cm; maturity (DAS)110,111 of Mestizo 19 and 20, respectively.

The thermosensitive genic male sterility (TGMS) is the so- called two- line system in developing hybrid rice. TGMS is conditioned primarily by the onset of a critical high temperature during panicle initiation to booting stage of growth. TGMS-based two line hybrids are considered to be commercially more viable under Philippine condition (De Leon, 2003).

Environment sensitive genetic male sterility or EGMS is the genetic tool used to develop the TGMS lines. TGMS, as a trait, is affected by changes in temperature and is quite independent of day length. It is effective in countries or places where high and low temperature areas can be differentiated.

The application of TGMS in breeding and seed production does not require the use of a maintainer line to produce a plant. Seed setting can be induced in the TGMS plant if grown in a place where a stable critical low temperature (>16°C - < 24°C) sets in during the panicle initiation or booting stage. Such a place or growing condition is sometimes referred to as the male fertile environment (MFE).

To make the same TGMS plants sterile, they should be grown in a place where a stable critical high temperature (>27°C) sets in during panicle initiation or booting stage. Such a place or growing condition is sometimes referred to as the male sterile environment (MSE), too.

On the other hand, to produce the F1 hybrid seeds, a pollinator will be used with excellent combining ability to pollinate TGMS plants grown under critical high temperature conditions or at the MSE site.

The advantages of TGMS over the CMS-based hybrids (three line system) are the seed production and activities are less cumbersome because there are no maintainers and restorers required. Procedure is straightforward. The TGMS lines are maintained by self-pollination and has wider choice of pollen parents since presence of restorer gene in the male parent is not necessary.

Environment in breeding and seed production in the two-line system are identified in Los Banos, Laguna; San Mateo in Isabela; Murcia in Negros Occidental; and Bukidnon for Male Sterile Environments (MSE) while Caranglan in Nueva Ecija; Tublay in Bunguet; DS Benedecto in Negros Occidental; Pangantukan

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