

Carbon as an Oxygen fertilizer for low land Paddy cultivation

*Thushyanthy, M. and **Basnayake, B.F.A

*Dept. of Agricultural Engineering, Faculty of Agriculture, University of Jaffna

**Dept. of Agricultural Engineering, Faculty of Agriculture, University of Peradeniya

Abstract

The rise of the labour cost and the need to intensify rice production through double and triple cropping provided the economic incentives for a switch to direct seeding. Simultaneously, the availability of high yielding, short duration varieties and chemical weed methods made such a switch technically viable. As the rice production systems undergo adjustments in response to the rising scarcity of land, water and labour, a major adjustment can be expected in the method of rice establishment and this would be possible since the direct seeded area in Sri Lanka is about 0.7 million ha, which is approximately 77% of the total rice area in the region.

In low land direct seeding cultivation particularly when the seeds are placed within the soil, lack of oxygen causes poor germination percentage because oxygen supply decreased almost to zero except in a thin layer at the soil surface in puddle conditions. In Japan and Thailand, calcium peroxide was used as oxygen fertilizer and in Pakistan, soil tilled to depth of 20 cm was irrigated with cold water that contains dissolved oxygen. These methods are very expensive and therefore experiments were conducted in the laboratory and field to investigate the possibility of supplying oxygen using carbon as an alternative source since carbon is used as an absorbent for gases. This sorptive properties of carbon is the result of their very large internal surface area as 1000 m²/g.

Carbon powder was prepared from grinding charred paddy husk and, a carbon coating machine was designed to coat the paddy seeds with carbon. Randomly three different viable paddy varieties BG 380, BG 400-1 and BG 94-1 were used. Coated and non coated seeds were planted in four different depth; 0 mm , 1 cm, 1.5 cm, 2 cm and seeds were placed manually in the laboratory and Jhonpillai seeder was used in the field. Laboratory and field conditions revealed that the germination was 100 percent for the seeds, which were placed on the soil surface when the depth of the seed placement was gradually increased the germination percentage decreased in uncoated seed. For coated seeds there was no any significant difference between the seeds which were placed on the soil surface and within the soil. Coating the paddy seeds with carbon was very effective in germination, improving seedling emergence and subsequent growth and can behave as a soil conditioner. However, keeping quality of coated seeds and possibility of using this technique for large- scale farming must be tested in a practical situation before recommending this technique.

Key words: Low land Paddy, Carbon, Oxygen fertilizer

Mikunthan, T and Basanayake, B.F.A. (2000). Carbon as an oxygen fertilizer for low land paddy cultivation, Proceedings of the 8th Annual sessions of the Jaffna Science Association, held on April 5th – 7th 2000, 8(1): 30.