



Potential use of F_1 sterility and the parasitoid, *Cotesia plutellae*, to control diamondback moth, *Plutella xylostella*, in Myanmar

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Abstract. Diamondback moth (DBM), *Plutella xylostella* males irradiated with 100 Gy and larval parasitoids (*Cotesia plutellae*) were studied for their potential to control DBM in cabbage fields of Nyaung-Le-Bin Township, Bago Division. The following treatments were evaluated as control tactics: release of irradiated male DBM, augmentative release of parasitoids, and combined release of irradiated male DBM and parasitoids. These treatments reduced the larval population of feral DBM.

1. INTRODUCTION

The diamondback moth (DBM), *Plutella xylostella*, is a serious pest of cabbage and other cultivated crucifers in Myanmar. Because the sterile insect technique (SIT) has been an effective method for the control of other lepidopteran pests, Myanmar scientists have studied the potential use of SIT for control of DBM. These studies have included population dynamics of DBM and its natural enemies, radiation biology of DBM, rearing technology for DBM and its parasitoids, and effectiveness of larval and pupal parasitoids of DBM. The overall objectives of these studies have been the development of SIT for population reduction of DBM, the reduction in the application of insecticides and the conservation of natural enemy populations in the field. In this report we describe a study designed to evaluate releases of irradiated male DBM, a larval parasitoid, and a combination of irradiated male DBM and parasitoids as control tactics for DBM.

2. MATERIALS AND METHODS

Cabbage is usually grown in the winter season (December–March) in fields of Nyaung-Le-Bin Township, Bago Division. Populations of DBM adults reach their peak during the first two weeks of February. We designed an experiment to evaluate the ability of SIT and augmentative biological control to suppress the seasonal population increase of DBM. The experiment was conducted in a cabbage field as a randomized complete block design. There were 3 experimental treatments and each treatment was replicated 4 times. Experimental treatments were (1) release of irradiated male DBM, (2) augmentative release of the larval parasitoid, *Cotesia plutellae*, and (3) combined release of irradiated male DBM and *C. plutellae*. Control plots were in a separate location. Each field plot was 4.6 x 1.2 m (5.5 m²). To ascertain the treatment effects, the number of larvae per 10 plants was recorded each week from each treatment.

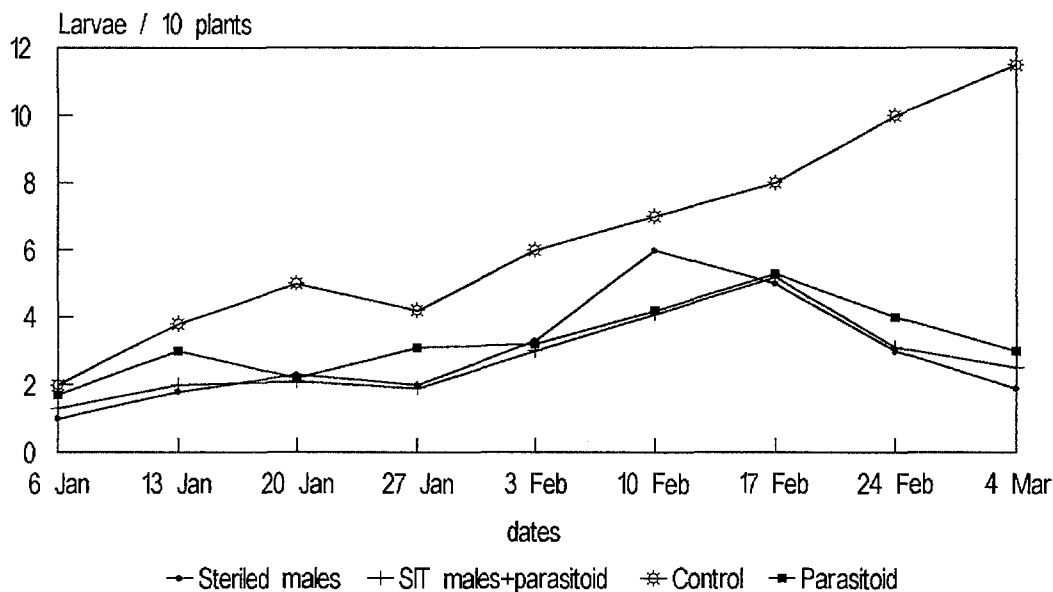


FIG.1. Effect of releasing irradiated diamondback moth (DBM), *Plutella xylostella*, males and the parasitoid, *Cotesia plutellae* on larval populations of feral DBM in cabbage.

3. RESULTS

The mean number of DBM larvae per 10 plants for each treatment is presented in Figure 1. The DBM larval population was higher in the control plots than in any of the treatment plots. Although the DBM larval populations were similar for all treatments and the control at the beginning of the experiment (January 6), the population in the control plots increased at a greater rate throughout the duration of the experiment. The differences between DBM larval populations of the control and the other treatments were greatest at the end of the experiment (March 4). The declining DBM larval population in the treatment plots beginning on February 17 may have been influenced by the in-field production of parasitoids (progeny of released parasitoids) and sterile F₁ DBM (progeny of irradiated, released DBM). No differences were observed between the different treatments. It is possible that the small size of the treatment plots allowed released moths and parasitoids to disperse from their release plot into other treatment plots. Nevertheless, these data indicate that the release of irradiated male DBM and the release of the parasitoid, *C. plutellae*, can reduce the seasonal increase of DBM populations in cabbage in Myanmar.

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