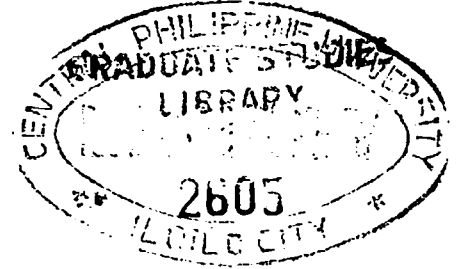


FIELD SCREENING OF FUNGICIDES FOR THE CONTROL  
OF PHILIPPINE CORN DOWNY MILDEW  
DURING WET SEASON

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## CHAPTER I

### INTRODUCTION

Corn (Zea mays Linn.) is the third most important cereal crop in the world after wheat and rice. It is grown throughout the temperate, subtropical and tropical zone whenever rainfall or irrigation is adequate. Corn is used mainly for animal feeds, but is also important staple food crop particularly in Africa, Asia and some central and south American countries.<sup>1</sup>

In the Philippines, corn is second to rice as staple food; approximately 20.8 per cent of the population eat corn grits (rice corn) instead of rice.<sup>2</sup> Corn ranks first as feed grain of the rapidly expanding poultry and livestock industries where 30 per cent of the total corn production is used as feed while only six per cent is used as raw material for industrial products.<sup>3, 4</sup>

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<sup>1</sup>U. S. Department of Agriculture. A Compendium of Corn Diseases (Washington, D. C.; Government Printing Office, 1973), p. 2.

<sup>2</sup>Corn Production in the Philippines (Laguna: College of Agriculture, University of the Philippines, 1970), p. 2.

<sup>3</sup>A. C. Morales. Types of Corn and Recommended Varieties in the Philippines, Multiple Cropping Sourcebook (Laguna: College of Agriculture, University of the Philippines, 1966), pp. 162-165.

<sup>4</sup>National Economic and Development Authority, National Census and Statistics, Philippine Yearbook (Manila: 1980), p. 247.

In the past, Philippine corn production was averaging only 0.84 ton per hectare.<sup>5</sup> The rapid increase in population and expansion of livestock and poultry industry had great demand for corn. As reported in the Philippine Yearbook the land area planted to corn was 3.3 million hectares with the production of 3.2 million metric tons valued at ₱965.3 million yet this production was still inadequate to meet the demand for corn so that the country resorted to the importation of this commodity.<sup>6</sup>

Low production of corn was attributed to several factors. One of these factors is the downy mildew disease. Downy mildew is considered one of the most destructive diseases of corn in the Philippines<sup>7</sup> and in tropical Asia.<sup>8</sup> It also occurs in Nepal, India, Republic of Africa and Africa.<sup>9</sup>

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<sup>5</sup>The Philippine Recommends for Corn (Laguna: Philippine Council for Agriculture Research, 1976), p. 1.

<sup>6</sup>National Economic and Development Authority. National Census and Statistics, loc. cit.

<sup>7</sup>S. C. Dalmacio and O. R. Exconde, "Chemical Control of Downy Mildew of Corn: 1. The Use of Protectant Fungicides," Philippine Phytopathology, 7(1 & 2): 53, 1971.

<sup>8</sup>K. Kaneko and B. A. Aday, "Inheritance of Resistance to Philippine Downy Mildew of Maize, Peronosclerospora philippinensis," Crop Science, 20(5): 590, September-October, 1980.

<sup>9</sup>U. S. Department of Agriculture, loc. cit.

The causal organism of Philippine corn downy mildew is presently known as Peronosclerospora philippinensis (Weston) Shaw.<sup>10, 11</sup>

As early as 1918, Weston noted that downy mildew diseases caused serious economic losses in corn that reached as high as 82 per cent or a total crop failure of introduced varieties.<sup>12</sup> Exconde estimated that in 1974-1975 crop year alone, the disease had robbed the country of 205,470 metric tons of corn valued at ₱178,759,000 as cited by Cosico<sup>13</sup> and Pablico.<sup>14</sup> Annually, downy mildew deprives the Filipino farmers of ₱109,445,856.<sup>15</sup>

Several programs were launched in the past to increase production like the 'Maisan 77' then recently President Ferdinand E. Marcos launched the 'Maisagana' program, a new feed grain program which covers white corn, yellow corn, sorghum and soybeans. Just like the Masagana 99 rice program its

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<sup>10</sup>Kancko and Aday, loc. cit.

<sup>11</sup>A. B. Molina, Jr. and O. R. Exconde, "Efficacy of Apron 35 SD (Metalaxyl) Against Philippine Corn Downy Mildew, 1. Effects of Seed-Dressing Methods and Rainfall Frequency," The Philippine Agriculturists, 64(1): 99, January-March, 1981.

<sup>12</sup>W. N. Weston, "Philippine Downy Mildew of Maize," Journal of Agriculture Research, 19:17-122, 1921.

<sup>13</sup>W. N. Cosico, "New Weapons Against Downy Mildew," Crops and Soils, 4(1):2, January-February, 1978.

<sup>14</sup>S. N. Pablico, "Downy Mildew Breakthrough," Modern Agriculture and Industry-Asia, 6(9):36-37, 1978.

<sup>15</sup>W. N. Cosico, "The Best Control Against Downy Mildew," Crops and Soils, 1(1): 6-7, February, 1975.

priority national endeavor is to attain self-reliance in food within three years, to increase production five times and at the same time to export yellow corn and sorghum to Japan, Korea and Taiwan by 1980.<sup>16</sup>

The awareness of the need for prevention and control of downy mildew can contribute to the success of increasing food production considering the fact that this disease is a deterrent to bountiful corn harvest.

Different chemical applications to control downy mildew namely: foliar spray, soil treatment and seed treatment with protective and eradivative action have been investigated. From 1962 to 1972 nearly 800 fungicides have been tested in the country to combat downy mildew but with partial success.<sup>17</sup>

Recently, newer fungicides with systemic action had made a breakthrough in the control of downy mildew with 100 per cent success. The use of seed-dressing fungicides like Ridomil 25 WP or Apron 35 SD agrees with the common belief that the more practical way of controlling disease of cereals, such as corn by chemical method is by seed treatment. Its effectiveness in controlling the disease, the ease by which the

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<sup>16</sup>Willie Ng, "President Launches Maisagana Program," Bulletin Today, December 17, 1981, pp. 1-4.

<sup>17</sup>W. N. Cosico, "Researches Score Breakthrough Against Downy Mildew," Crops and Soils, 4(1): 1, January-February, 1978.

chemical is applied and the small amount needed to sustain 100 per cent control will surely make its application acceptable and adaptable to farmers.<sup>18, 19</sup>

Although downy mildew disease of corn is presently controlled by the use of resistant varieties, it is expected that recommended varieties will sooner or later succumb to the ever changing virulence of Peronosclerospora philippinensis<sup>20</sup> and the differences in strains of the fungus present in the locality, hence, the need to find the effect of the chemicals at Kabankalan, Negros Occidental.

#### Statement of the Problem

This study covered the field screening of fungicides for the control of Philippine corn downy mildew, Peronosclerospora philippinensis (Weston) Shaw during wet season under Negros Occidental Agricultural College (NOAC) conditions.

#### Object of the Study

Objects of the research were:

1. to determine which of the fungicides is most

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<sup>18</sup>O. R. Exconde, "Chemical Control of Philippine Corn Downy Mildew, A New Dimension," Professorial Chair Lecture, University of the Philippines at Los Baños, 18, 1978.

<sup>19</sup>Molina and Exconde, loc. cit.

<sup>20</sup>N. S. Franje and A. R. Josue, "Integrated Control of Philippine Corn Downy Mildew," CMU Journal of Agriculture Food and Nutrition, 3(1): 48, 1981.

effective in controlling downy mildew of corn;

2. to determine which of the corn varieties will produce more under the influence of the disease; uc

3. to determine the best fungicides and variety combination that will result in maximum economic yield;

4. to find out the interaction effect between fungicides and varieties used;

5. to find out the regression and correlation effect between grain yield and downy mildew infection;

6. to determine the relationship of environmental conditions (temperature, relative humidity and rainfall) with infection; and

7. to determine the estimated per hectare cost and return analyses by corn variety and fungicide used.