

EFFECT OF THE FUNGICIDES ANZEB 85 WP AND DIZEB M45 WP ON LATE BLIGHT (*PHYTOPHTHORA INFESTANS* (MONT.) DE BARRY) INCIDENCE ON POTATO DURING THE RAINY SEASON AT DALAT

Pham Xuan Tung, Nguyen Tuyet Hau & Lai The Hung
Dalat Research Center for Food Crops

SUMMARY

Effect on late blight infestation on potato of the new mancozeb –based fungicides Anzeb 80WP and Dizeb M45 80WP was tested in the field under natural conditions at Dalat during the rainy season 2001. Results indicated that both fungicides were effective against the disease infestation expressed as reduction in both disease incidence and disease severity. Anzeb 80WP is recommended to be used at the rate of 2 –3 kg /ha, while Dizeb M45 80WP 1.5 – 2 kg/ha, the higher rates being for the conditions highly conducive for the disease development.

INTRODUCTION

Late blight (*Phytophthora infestans* (Mont.) De Barry) is a major threat of potato cultivation in Dalat. The disease is especially disastrous during the rainy season from May to October. Losses have been observed as high as 100 % with susceptible potato varieties that are often attacked as soon as after the emergence. The most popular varieties (07 and 06) currently used in production in the area have only an intermediate level of resistance to the disease and losses of 20 - 30 % have been estimated during the rainy season.

With the moderate level of resistance of the widely used varieties, application of effective fungicides is the major measure for controlling the disease and protecting the crop. The most commonly used chemicals are the preparations of cymoxanil (Curzate M-8), mancozeb (Mancozeb, Dithane M-45, Manzate...), metalaxyl (Ridomil Gold 68 BHN, Fortazeb, Apron 35 SD,), zineb (Zodiac 80 WP, Zinforce 80 WP) and copper compounds (copper hydroxide, copper oxychloride), single or in combinations (Ministry of Agric. & RD, 2001). And every year, new preparations continue to be tested and introduced into practical application.

This paper reports on the results obtained from field testing of two new preparations, namely Anzeb 80 WP and Dizeb M45 80WP.

MATERIALS AND METHOD

Both fungicides tested are new preparations of mancozeb as the active ingredient. Dizeb M45 80 WP is a product of Jiangyin Jianglian Industry & Trade Co.Ltd, while Anzeb 80

WP is from the Southern Pesticide Co. Ltd. These fungicides were in a process of testing before their registration for production.

Tests of efficacy of the fungicides were conducted in the field under natural conditions during July 2001 on the variety 07 (Dizeb M45 80 WP) and 06 (Anzeb 80 WP) which has an intermediate level of resistance to late blight. Unreplicated test plots (sprayed and unsprayed) of 300 m² were set up within a potato field. The chemicals were sprayed in the usual way and incidence of late blight infestation was recorded for disease incidence (% leaves infected) and disease severity (index). In the case of Anzeb 80WP, the rate of application were 2 kg/ha and 3 kg/ha in comparison with Ridomil MZ 72 WP, 3kg/ha. Records were taken prior to applying the chemical, 7 days after the first spray, 7 days after the second spray (or 14 days after the first spray) and 14 days after the second spray (or 21 days after the first spray). Dizeb M45 WP was applied at 1,5 kg/ha and 2 kg/ha to compare with Ridomil MZ 72 WP, 3 kg/ha. Disease scoring procedure was similar to that for Anzeb 80 WP, with the interval between sprayings and recordings shortened to 5 day.

To take records on disease incidence and severity, leaves of 2 plants at each of 10 randomly selected spots per plot were taken for inspection. The disease incidence was calculated as follows:

$$\% \text{ leaves infected} = \frac{\text{No of infected leaves}}{\text{Total No of leaves inspected}} \times 100$$

while the disease severity is estimated by the formula:

$$\text{Disease index (\%)} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N} \times 100$$

Where n_1 = number of leaves with infection degree 1 ($\leq 1\%$ leaf area)

n_2 =	“	2 ($\leq 10\%$ leaf area)
n_3 =	“	3 (11-25 % leaf area)
n_4 =	“	4 (25-50% leaf area)
n_5 =	“	5 ($> 50\%$ leaf area)

A t-test was performed to compare the treatment means and demonstrate the statistical significance of their differences.

RESULTS AND DISCUSION

The fungicides tested could not completely stop the blight infestation under the very wet conditions caused by the continual rains during the season. However, application of all three chemicals slowed down the process of blighting under the very inductive conditions (Tables 1, 2, 3 & 4).

With Anzeb 80 WP, after the first and second sprays, the disease continued to progress on variety 06, but with considerably slower rate indicated by the significantly lower disease incidence and severity compared to the unsprayed control (Table 1 & 2). Application of Anzeb 80 WP at the rate of 3 kg/ha had a best effect in reducing the disease progress while the rate of 2 kg/ha was no better than application of Ridomil MZ 72 WP at the rate of 3 kg/ha).

Table 1. % of leaves of variety 06 infected by late blight before and after application of different rates of Anzeb 80 WP during the rainy season 2001, at Dalat.

Treatment	Before application	7 days after 1 st application	7 days after 2 nd application	14 days after 2 nd application
Anzeb 80 WP 3 kg/ha	4.7	5.7 c	8.6 c	10.2 c
Anzeb 80 WP 2 kg/ha	4.5	6.7 b	10.2 b	12.7 b
Ridomil MZ 72 WP 3 kg/ha	4.7	6.4 bc	9.5 bc	12.6 b
Control	4.7	7.7 a	11.5 a	14.7 a
Significance	Ns	***	***	***

ns and *** : not significant and significant at P=0.001

On variety 07 and Dizeb M45 80 WP, a heavy rain after the first application seemed to wash off most of the chemical and minimized the effect (Table 3 & 4). After the second spray, however, disease progress was considerably slowed down demonstrating the protective effect of all fungicides. The best effect was observed with Dizeb M45 70 WP applied at the rate of 2 kg /ha. Application at the lower rate, 1,5 kg/ha, did not show a significant difference from Ridomil MZ 72 (Table 3 & 4).

Table 2. Late blight index of variety 06 before and after application of different rates of Anzeb 80 WP during the rainy season 2001 at Dalat.

Treatment	Before application	7 days after 1 st application	7 days after 2 nd application	14 days after 2 nd application
Anzeb 80 WP 3 kg/ha	1.3	1.8 c	3.6 c	4.8 c
Anzeb 80 WP 2 kg/ha	1.1	2.5 ab	4.4 b	6.1 b
Ridomil MZ 72 WP 3 kg/ha	1.3	2.2 b	4.1 b	5.9 b
Control	1.2	2.7 a	5.7 a	8.0 a
Significance	Ns	***	***	***

ns and *** : not significant and significant at P=0.001.

Table 3. % of leaves of variety 07 infected by late blight before and after application of different rates of Dizeb M45 80WP during the rainy season 2001, at Dalat.

Treatment	Before application	5 days after 1 st application	5 days after 2 nd application	10 days after 2 nd application
Dizeb M45 80 WP, 1,5 kg/ha	25.1	35.6 b	28.7 bc	36.6 b
Dizeb M45 80 WP, 2 kg/ha	19.1	29.9 c	21.9 c	30.1 c
Ridomil MZ72 WP, 2.5 kg/ha	25.3	36.4 b	31.8 b	39.2 b
Control	23.9	52.3 a	73.1 a	95.4 a
Significance	ns	***	***	***

ns and *** : not significant and significant at P=0.001

Table 4. Late blight index of variety 07 before and after application of different rates of Dizeb M45 80 WP during the rainy season 2001 at Dalat.

Treatment	Before application	5 days after 1 st application	5 days after 2 nd application	10 days after 2 nd application
Dizeb M45 80 WP, 1.5 kg/ha	2.6	4.4 c	3.0 bc	4.5 bc
Dizeb M45 80 WP, 2 kg/ha	1.7	4.2 c	2.2 c	3.9 c
Ridomil MZ72 WP, 2.5 kg/ha	2.0	5.4 b	3.8 b	4.9 b
Control	2.3	10.5 a	14.6 a	15.9 a
Significance	ns	***	***	***

ns and *** : not significant and significant at P = 0.001

RECOMMENDATION

Anzeb 80 WP and Dizeb M45 80WP have reliable protective effect on late blight of potato. The effective rates of application are 1.5 – 2 kg/ha with Dizeb M45 80WP and 2-3

kg/ha with Anzeb 80 WP. Under rainy conditions with high air humidity and high disease pressure, it is advisable to apply the higher rate at shorter intervals between sprays (5-7 days).

REFERENCES

Ministry of Agric. & Rural Development, 2001. List of pesticides and agricultural chemicals non-prohibited for use in Vietnam. By Minister's Decision No 17/2001/QD – BNN-BVTV.