การทดสอบพันธุ์ไหมต้านทานต่อโรค Aspergillus

Varietal Resistance of Silkworm to Aspergillus Disease

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ABSTRACT

An attempt dealt with the varietal resistance of 10 silkworm varieties to *Aspergillus* disease was made under laboratory condition. The isolation of *Aspergillus flavus* Link. used in this study was collected from silkworm rearing room at the Sericultural Research and Training Centre, Korat by trapping method. Spores used were obtained by culturing the fungus on Czapek's Sucrose Nitrate Agar medium for 10 days at 30 C. Silkworm 2nd instar newly exuviated, were inoculated by dipping method in the 2 concentration of spore suspension, and then, contaminated worms were fed until they developed to the 5th instar. The result showed the remarkable difference between Japanese and Thai varieties of silkworm in their resistibility to *Aspergillus* disease. The degree of resistance of Japanese varieties is K_3, K_4, K_4 x Tdai F_1, K_1, Mayu. Tdai while Thai varieties is 15KY, 17L, 15K, PC21Y. The most resistance overall varieties is 15KY.

In 1965 Raper and Fennel reported that *Aspergillus* fungi were very widely distributed in nature, they were regularly isolated from soil particularly those from tropical and subtropical areas (2).

Recently it was recognized that *Aspergillus* disease causing by *Aspergillus* fungi is one of the serious silkworm diseases in Thailand. It often causes extensive damage to silkworm rearing. At present, various varieties of silkworm, Thai (polyvoltine) and Japanese (bivoltine) are reared in Thailand. So, using 10 varieties, Japanese 6 and Thai 4, varietal resistance of silkworm to *Aspergillus* disease was tested under labaratory condition.

Materials and Method

Varieties of silkworm tested are as follows:

Japanese varieties (bivoltine)	Thai varieties (polyvoltine)
1. K 1	1. 15 K
2. K 3	2. 15 KY
3. K 4	3. 17 L
4. Mayu	4. PC21Y
5. Tdai	
6. K 4 x Tdai F_1	

The isolation (K—1) of *Aspergillus flavus* Link. used in this study was done in silkworm rearing room at the Sericultural Research and Training Centre by trapping method (1, 2, 3). The fungus was maintained on Czapek's Sucrose Nitrate Agar medium, composed of $NaNo_3$, 2.0 g; K_2HPO_4, 1.0 g; $MgSO_4.7H_2O$, 0.5 g; KCL, 0.5 g; $FeSO_4.7H_2O$, 10.0 mg; sucrose, 30.0 g; agar 15.0 g; distilled water 1000.0 ml. Spores used were obtained by culturing the fungus on the same medium for 10 days at 30 C.

Silkworm, 2nd instar, newly exuviated, were inoculated by the following method. First of all, two dilutions of inoculum were prepared. One was 1 : 1 (spores of 1 platinum loop : water 1 ml), the other 1 : 10 (1 loop : water 10 ml). To facilitate uniform distribution of spores, spores were suspended in a detergent, "Lux" (diluted 1 : 20,000 with water). 10 ml of this suspension was transferred into each of petri dishes (9 cm in diameter). Silkworms were dipped into spore suspension for about 1 minute. Ten larvae were used in each dilution of 2 replications. After inoculation, silkworms

were fed in the plastic box, 12.5 cm in width, 12.5 cm in length and 5 cm in height. The rearing boxes were kept closed with covers for about 24 hours, regarding to high humidity is necessary for well germination of the spores. The number of dead silkworm was recorded daily until the insects develop to be the 5th instar. Feeding term was about 10 days.

Results and Discussion

The results are shown in Table 1. There was a remarkable difference between Japanese and Thai silkworm varieties in their susceptibility to *Aspergillus* disease. Tdai was the most susceptible among 10 varieties tested. Among Japanese varieties tested, K 3 was distinctly less infected than others. Tdai was more susceptible than K 4, but the susceptibility of their F1 hybrid (K 4 x Tdai) was very similar to that of K 4. Most of Thai varieties used, excepting PC21Y, were highly resistible to this disease. Among 4 Thai varieties tested, 17 L and 15 KY were relatively resistant.

The mortality pattern was also observed as shown in Figs. 1—2.

On the second day of inoculation in the high concentration lot (1 : 1), some of silkworms of Tdai, Mayu and PC21Y died, while in the other varieties it occured on the third day. In most of Japanese varieties, silkworms were infected in the early part of observation period with high mortality. In Thai varieties infection occured gradually throughout the whole period.

From the data mentioned above, it may be concluded that Thai varieties endowed with different degrees of resistance to *Aspergillus* disease.

Table 1. Percentage mortality of silkworm from *Aspergillus* disease caused by *Aspergillus flavus* Link.

Silkworm varieties	Concentration of Aspergillus spore		Control
	1 : 1	1 : 10	
Japanese (bivoltine)			
K 1	85	40	0
K 3	45	30	0
K 4	60	45	0
Mayu	90	40	0
Tdai	95	65	0
K 4 x Tdai F_1	70	30	0
Thai (polyvoltine)			
15 K	35	15	0
15 KY	15	15	0
17 L	20	5	0
PC 21 Y	70	10	0

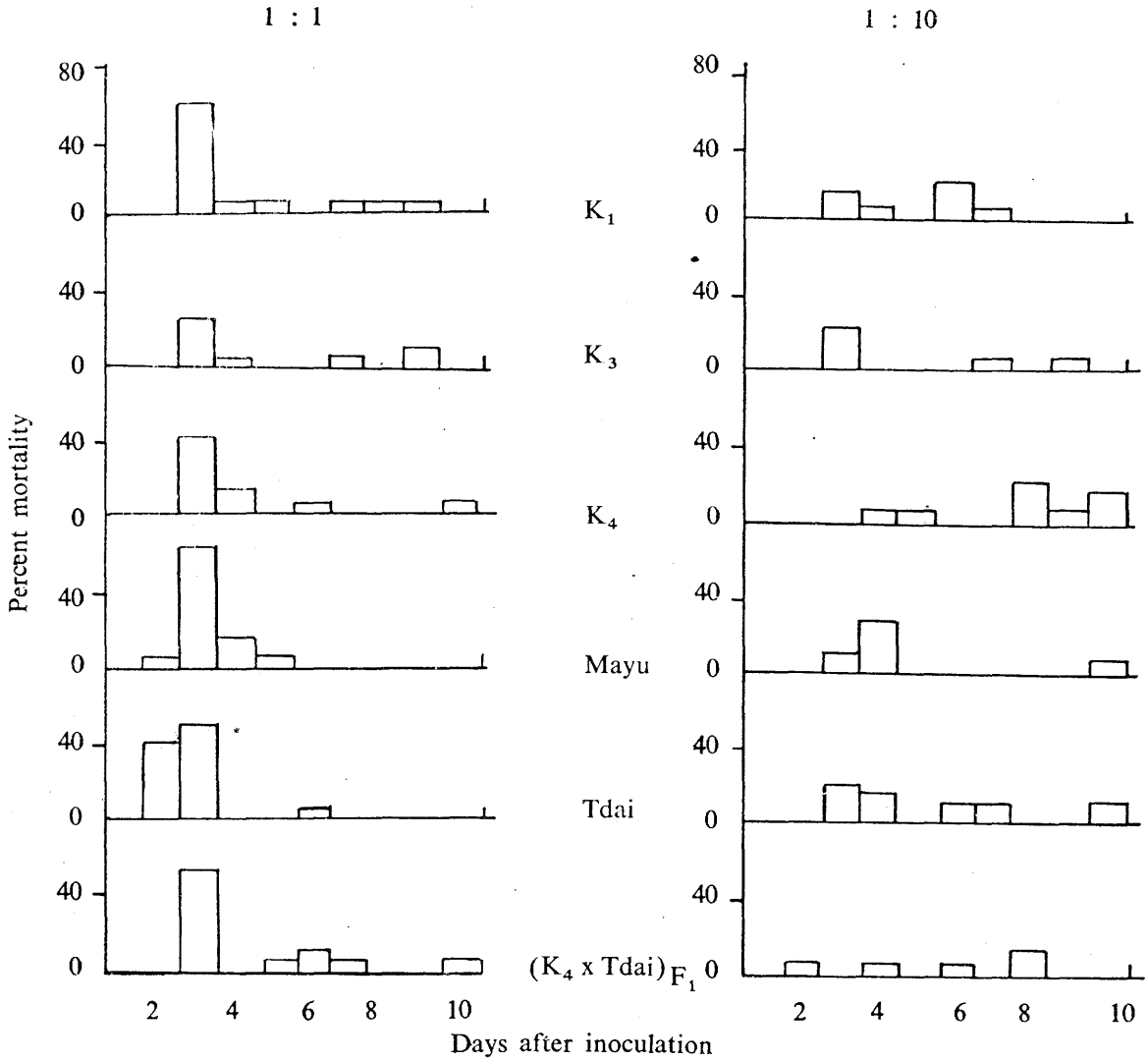

Fig. 1 Mortality patterns of Japanese silkworm varieties.

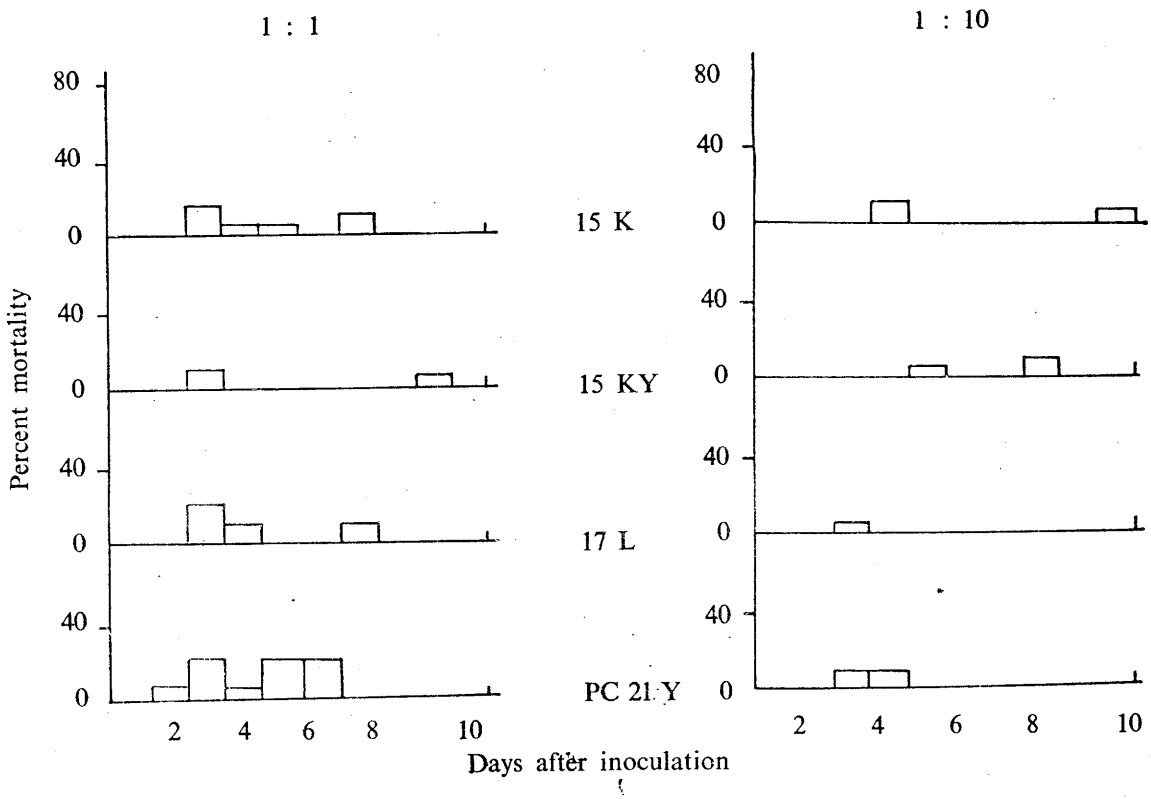

Fig. 2 Mortality patterns of Thai silkworm varieties.

Literature Cited

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