STUDY CHEMICAL CONTROL OF INSECT PESTS ON UPLAND RICE *)

by

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Ringkasan

Tanaman padi gogo mempunyai dua macam hama yang specifik padanya lalat bibit padi *Atherigona exigua* Stein dan hama lundi *Holotrichia helleri* Bersk. Hama-hama tersebut merusak tanaman muda yang baru tumbuh. Di berbagai daerah pertanaman gogo, kedua hama tersebut kadang-kadang terdapat bersama. Kerusakan tanaman gogo oleh hama-hama tersebut untuk daerah-daerah tertentu cukup besar, sedangkan cara untuk mengatasinya belum cukup diketahui.

Penulis telah mengadakan penelitian sejak musim hujan 1970/1971 dan 1971/1972 di daerah Wonosari dan Kebun Percobaan Banguntapan, Yogyakarta. Beberapa insektisida aldrin 40 W.P., Dieldrin 50 W.P., gamma BHC-6G dan Heptachlor-10G dipergunakan secara „seed treatment" dan „soil treatment" dengan berbagai perlakuan. Angka-angka kerusakan dan timbangan hasil panen yang diamati digunakan untuk menentukan pengaruh perlakuan.

Penggunaan gamma BHC-6C secara soil treatment dengan dosis 20 kg a.i per hektar diberikan sebelum tanam dapat menekan lalat bibit padi maupun hama lundi dan menaikkan hasil panen. Adrin dan Heptachlor hanya dapat menekan kerusakan oleh hama lundi pada penggunaan soil teatment. Aldrin, Dieldrin dan Heptachlor dengan cara soil treatment tidak nyata menekan lalat bibit, namun nyata memberikan hasil panen lebih tinggi. Seed treatment Aldrin 40 W.P. 12 gr per kg benih tidak nyata menekan lalat bibit maupun hama lundi, tetapi nyata menaikkan hasil panen. Dieldrin tidak nyata memberikan efek pemberantasan terhadap lalat bibit dan hama lundi bila digunakan secara seed treatment. Perlakuan soil treatment pada saat menyiang tanaman tidak memberikan efek pemberantasan.

Summary

The seedling fly, *Atherigona exigua* Stein, and white grubs, *Holotrichia helleri* Bersk. are the main insect pests of upland rice. These insects injure the upland rice plant rice at the early growing stage. Complex and varying damage become very evident in many locations, and no acceptable control is available to date. These investigations were carried out during the wet seasons of 1970/1971 and 1971/1972 at two locations near Yogyakarta.

Aldrin 40% w.p., dieldrin 50% w.p., BHC-6H and heptachlor-10G were tested for their effect on evidence of damage and on rice yield, by using them as seed treatment and soil treatments. The use of BHC-6G soil treatment at the rate of 2.0 kg active ingredient before planting gave satisfactory control of seedling fly as well as white grubs. Aldrin and heptachlor gave satisfactory control of white grubs only by using them a soil treatments. Aldrin, dieldrin and hepta chlor did not control seedling fly damage, but increased rice yield significantly. Seed treatment with aldrin 40% w.p. at the rate of 12.5 grams per kilogram of rice seed gave no satisfactory control of seedling fly or white grubs, but the rice yield increased significantly. Dieldrin did not give satisfactory control as a seed treatment for seedling fly nor for white grubs. Second soil treatment at weeding time did not significantly affect control of the pests.

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Introduction

The seedling fly, **Atherigona exigua** Stein, and the white grubs, **Holotrichia helleri** Bersk. are the economic significance of insect pests of upland rice in Java, Indonesia. Both insect pests make some damage on the early growing stage of upland rice plant. Seedling fly attacks on the growing paint of plant and the white grubs eat by cutting the root and the base of root of plant.

Van der Laan (1951) described the life history of the seedling fly. In some experiments it was found that dust with 5% HCH, applied daily 7 times after the young seedling appeared above the ground, had excellent control. Fewer than 7 applications, or further diluting of the insectides had less effect. Other insecticides, such as DDT, taxaphine and Derris, were not suitable for the control of the pest. Some references mentioned about the rice seedling fly are Fransen (1932), Tjoa Tjien Mo (1952) and Kalshoven (1952).

The white grubs as soil fauna attacks on the young roots and the bottom of the stein of upland rice. Corn and sorghum are the other major host plants. In the adult stage of the beetle eats mostly on the leaves of several kind of plants. Tjoa Tjien Mo (1952) made some study on the life history and control of the white grubs in about 1924 - 1935. There is only one generation during a year. Mohamad Iman conducted some field experiment to control the white grubs on soy bean during 1969 - 1970.

During the wet season of 1970/1971 and 1971/1972 some field experiments were conducted at Banguntapan field and Awar-Awar, Wonosari. These experiments dealing with the both major insect pest of upland rice, by using of seed dressing and soil treatment to find out method of application effectively. Some chlorinated hydrocarbon insecticides has been tested. It was found that both insect pests distributed in the Awar-Awar field, and the only seedling fly in the field of Banguntapan.

Materials and Methods

1. Experiments during the wet season 1970/1971. These experiments were conducted at Banguntapan field and Awar-awar fields Wonosari, at about 6 km and 50 from Yogyakarta. Several chlorinated hydrocarbon insecticides were tested : as seed treatments, aldrin 40% w.p and dieldrin 50% w.p; as preplanting soil treatments, aldrin 40% w.p., dieldrin 50% w.p. and BHC-6G and heptachlor-10G as single treatments. Series of five soil treatments at the first weeding time as the second treatments were also observed. Twelve treatments (including the check) were given using a Randomized Block Design with four replications. The upland rice varieties Gama-61 and Putu, local variety, were planted on 5 x 10 meter plots. Fertilizers were used at the rate of Urea (40N) 150 kg per hectare and triple phosphate at the rate of 30 kg per hectare. Percent of damage evident at the early growing stage of the plants was recorded from 36 hills out of approximately 680 hills per plot. Rice yields were recorded when the plots were harvested.

2. Experiments during the wet season 1971/1972. These experiments were in continuation of the above mentioned and at the same two locations. Four treatments consisted of . aldrin 40% w.p. as seed treatment at the rate of 12.5 g per kg seed; BHC-6G as a single preplanting soil treatment; aldrin as a first seed treatment and BHC-6G as a second in-soil treatment at the first weeding time; and the check. These four treatments were given using a Randomized Block Design wih five replications. Gama-61 variety was planted on 4 x 6 meter plots, at the rate of 5 seeds per hill with 25 x 25 cm of planting space. Urea at the rate of 100 kg and triple phosphate at the rate of 50 kg per hectare were used on each plot. The percent of damage were recorded on 15 of approximately 330 hills per plot. Rice yields were recorded at harvest time.

1. Experiments at Banguntapan 1970/1971. None of the treatments gave satiscfactory control of visible damage by the seedling fly at the two weeks after seeding. One months after seeding only BHC-6G as a soil treatment gave significant protection from damage. All treatment except dieldrin as a seed treatment increased the rice yields to significance level of 0,05 and 0.01. The second application of soil treatment at weeding time gave no significant control, campared to single treatment before seeding (Table-1).

2. Experiments at Wonosari 1970/1971. None of the treatments gave satisfactory control of visible damage by the white grups were appeared by using BHC-6G as a single preplanting soil treatment, and also by using of BHC-6G and heptachlor-10G as a double soil treatments gave no visivle damage. Aldrin as a preplanting soil treatment gave highly significant control. Aldrin and dieldrin as a seed treatment did not give significant control of white grubs, and neither did by dieldrin as a single preplanting soil treatment. All treatments except dieldrin as a preplanting soil treatment increased rice yields to significance level of 0.01 (Table-2)

3. Experiment at Banguntapan 1971/1972. Satisfactory control of seedling fly was obtained by using aldrin as a seed treatment increased the rice yield high significantly. Satisfactory control and increased rice yield was also obtained by using BHC-6G as a preplanting soil treatment.
Using BHC-6G as a preplanting soil treatment with a second treatment at weeding time gave no significant increase in insect control nor rice yield, compared to single treatment. All treatments increased rice yields to the significance level of 1.01 (Table-3).

4. Experiment at Wonosari 1971/1972. None of the treatment gave satisfactory control of visible damage by the seedling fly at two weeks after seeding. One month after seeding BHC-6G as a preplanting soil treatment. and also application of aldrin as a seed treatment along with BHC-6G as a soil treatment at weeding time gave satisfactory control. All treatments increased rice yield at the level significance of 0.01 (Table-4).

Table-1. Control of seedling fly on upland rice by seed dressing and soil treatment at Banguntapan field, Yogyakarta 1970/1971.

Treatment	percent of plant damage x) after seeding 15 days	30 days	yield of dried grain quintal per hectare
A. Seed dressing aldrin 40 w.p. 12.5 grams per kilogram of seed	48.48	23.84	9.30 *
B. Seed dressing dieldrin 50 w.p. 10 grams per kilogram of seed.	35.26	23.58	7.20
C. Soil treatment aldrin 40 w.p. 2.0 kg a.i. per hectare	37.56	21.27	13.72 **
D. Soil treatment dieldrin 50 w.p. 2.0 kg .ai per hectare	32.08	25.38	12.62 **
E. Soil treatment BHC-6G 2.0 kg a.i. per hectare	9.44	7.38 **	13.38 **
F. Soil treatment heptachlor-10G 2.0 kg a.i per hectare	12.59	14.44	11.88 **
G. Seed dressing aldrin (same as A) and soil treatment dielrin (same as D) at weeding time	37.12	18.19	8.70 *
H. Seed dressing aldrin (same as A) and soil treatment BHC-6G (same as E) at weeding time	40.78	21.94	13.95 **
J. Soil treatment dieldrin (same as D) and soil treatment at weeding time	33.53	21.99	13.05 **
K. Soil treatment BHC-6G (same as E) and soil treatment at weeding time	9.77	11.45 *	12.30 **
L. Soil treatment heptachlor (same as F) and soil treatment heptachlor at weeding time	23.26	21.68	12.38 **
M. Check	50.26	22.86	2.88
LSD 0.05	n.s.	9.39	4.97
0.01		12.87	6.76

x) = data transformed in Arcsin V y
* = significant
** = highly significant

Table-2. **Control of seedling fly and white grubs on upland rice by seed dressing and soil treatment at Awar-Awar field, Wonosari, 1970/1971.**

Treatment	percent of plant damage x) seedling fly 15 days	white grubs xx) 30 days xxx)		yield of dried grain qts per hectare
A. Seed dressing aldrin 40 w.p. 12.5 grams per kilogram seed	26.20	36.05	7.6	2.24 **
B. Seed dressing dieldrin 50 w.p. 10 gram per kilogram seed	35.04	33.88	7.9	1.64
C. Soil treatment aldrin 40 w.p. 2.0 kg a.i	38.79	23.97	5,3 **	3.52 **
D. Soil treatment dieldrin 50 w.p. 2.0 kg a.i per hectare	32.66	40.24	16.4	0.67
E. Soil treatment BHC-6G 2.0 kg a.i per hectare	20.59	32.86	0.0	3.63 **
F. Soil treatment heptacholor 10G 2.0 kg a.i per hectare	20.98	26.04	8.2 *	2.39 **
G. Seed dressing aldrin (same as A) and soil treatment dieldrin (same as D) at weeding time	29.32	33.53	5.7 **	2.15 **
H. Seed dressing aldrin (same as A) and soil treatment BHC-6G (same as E) at weeding time	26.52	34.32	3.2 **	2.59 **
J. Soil treatment dieldrin (same as D) and soil treatment dieldrin at weeding time	32.95	37.19	7.1 *	2.14 **
K. Soil treatment BHC (same as E) and soil treatment at weeding time	26.05	21.25	0.0.	3.77 **
L. Soil treatment heptachlor (same as F) and soil treatment heptachlor at weeding time	38.25	31.08	0.0	3.36 **
M. Check	33.61	39.97	13.5	0.53
LSD 0.05	n.s	n.s	6.00	1.13
0.01			7.69	1.54

xx) = mean of two observations at 15 days and 30 days after seeding
** = highly significant
* = significant
xxx) = number of days after seeding
x) = data transformed to Arcsin V x.

Table-3. Control seedling fly on upland rice by seed dressing and soil treatment at Bangun-tapan field, Yogyakarta. 1971/1972.

Treatment	percent of plant damage x) 15 days after seeding	30 days after seeding	yield of dried grain in quintals per hectar
Seed dressing aldrin 40 w.p. 12,5 grams per kilogram seed	29.25*	24.73	16.90**
Soil treatment BHC-6G 2 kg a.i. per hectar	18.91**	12.67**	20.50**
Seed dressing aldrin 40 w.p. 12,5 grams per kg seed, and soil treatment BHC-6G 2.0 kg per hectar at weeding time.	27.06*	16.37**	24.20**
Check	40.43	30.54	4.40
LSD 0.05	8.44	9.46	4.80
0.01	11.84	13.33	6.72
CV			16.32 %

x) = data transformed in Arcsin V x
*) = significant
**) = highly significant

Table-4. Control of seeding fly on upland rice by seed dressing and soil treatment at Awar-awar field, Wonosari, 1971/1972.

Treatment	percent of plant damage x) 15 days after seeding	30 days after seeding	yield of dried grain in qts. per hectare
Seed dressing aldrin 40% w.p. 12.5 grams per kilogram seed	7.19	26.47	8.93 **
Soil treatment BHC-6G 2 kg a.i. per hectare	11.06	8.54 **	10.43
Seed treatment aldrin 40% w.p. 12.5 grams per kilogram seed, and soil treatment BHC-6G 2.0 kg per hectare at weeding time	8.22	13.11 **	10.15 **
Check	13.47	25.57	1.83
LSD 0.05	n.s.	11.20	3.94
0.01		15.73	5.53
CV			16.30%

x) = data transformed in Arcsin V x
*) = significant
**) = highly significant.

Literature cited

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