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SHORT COMMUNICATION

STATE OF INSECTICIDE RESISTANCE OF BROWN PLANT HOPPER IN MEKONG DELTA, VIETNAM

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ABSTRACT

The areas infested by BPH and average population densities of BPH were reduced as compared to those in five years ago. Small outbreak of BPH in 2006 occurred in the large scale area of 210,000 ha. In April 2006, a pesticide company reported that two imidacloprid insecticides at recommended rates of 28 and 20 gram a.i./ha showed very good control of BPH in wet season (2005-2006). Almost all insecticides got mortality above 50% when Tri Ton BPH is treated at dose 3 and 83-100% when it is treated at dose 4. However; imidacloprid 10WP, imidacloprid 700WG, buprofezin 10WP, fipronil 5SC, etofenprox 10EC were only effective when they were used at higher dosages than recommended rate.

Key words: brown plant hopper, buprofezin, etofenprox, fipronil, imidacloprid

RESULTS AND DISCUSSION

Brown plant hopper (BPH) is the main target insect to rice production in the Mekong Delta. It caused serious hopper burn in 1978, 1991, 1992. After then BPH population and infected areas are usually much higher and larger than those before 1990 but the severity of damage is less than before. The decrease of recent BPH population is mainly resulted from unfourable weather conditions, especially due to typhoons and floods in September and October of 1999-2003. Diversification of genetic back-ground for resistance to BPH in rice varieties help to attribute and suppressing the BPH population build-up. However, its virulence has increased gradually and it becomes the most harmful as compare to others parts of Vietnam.

The outbreak of BPH in 2006 occurred on large scale. Total infected areas come up to 210,000 ha. The main causes of this epidemic are as followed:

- Stress due to abnormal weather in the Mekong Delta such as fogging and late raining.
- Gene sources for resistance to BPH has not been diversified in the past ten years. There is no new gene besides the resistant genes from varieties as CR94-13, Ptb 33, Ptb 18, Rathu Heenati and Babawee excepted the only one rice variety named AS996 inherited new gene from wild rice (*Oryza rufipogon)*.
- The increase in areas of BPH susceptible aromatic rice varieties such as Jasmine 85, MTL250, Nang thom cho Dao, ST1, VD20, ..*etc* and moderately susceptible varieties as OM1490, OM2514, OM2717, VNĐ 95-20, OM2517, OMCS2000, OM3536.
- Farmer practice was still follow the same habit with high seed rate, high dosage of nitrogen application, mis-use of insecticides, un-timing of spraying and incorrect method of spraying.
- Development of BPH virulence.

Besides these some farmers also reveals that several insecticides have been resisted by BPH in the Mekong Delta such as imidacloprid and fenobucarb.

In April 2006, one pesticide company reported that two imidacloprid insecticides at recommended dose rate (28 and 20 gram *a.i.*/ha) exhibited very good control of BPH in 2005-2006 wet season (WS), except in Tien Giang and Long An.

In January 2007, they informed that there are evidence of BPH resisted to imidacloprid in Long An (Figure 1 and Tables 1&2).

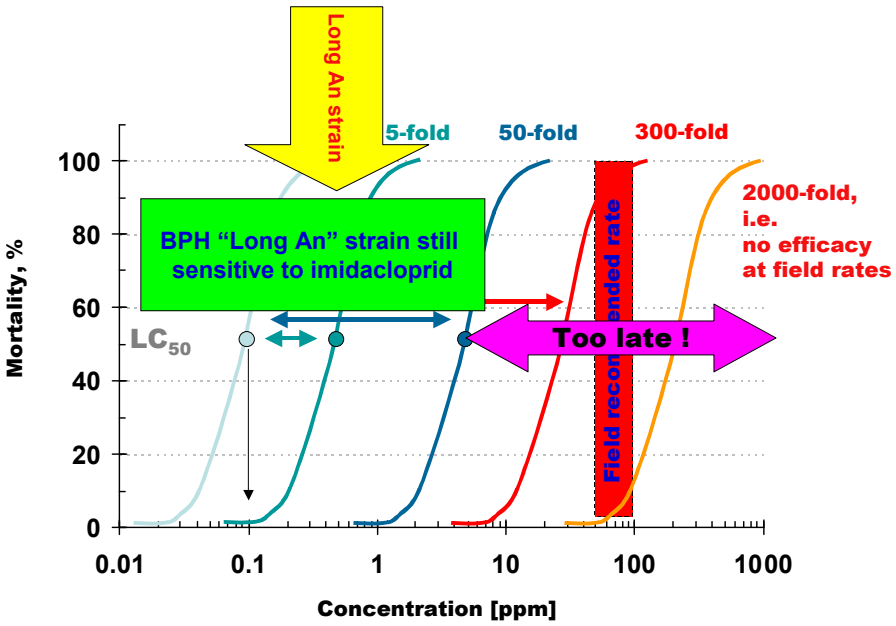


Table 1. Efficacy of Imidacloprid 700 WG demonstration (%)

Province	District	1 DAA	3 DAA	5 DAA	7 DAA	15 DAA
An Giang	An Phu	77	98	90	95	95
An Giang	Cho Moi	74	93	99	99	100
An Giang	Phu Tan	73	92	97	93	95
Dong Thap	Cao Lanh	71	91	91	91	92
Dong Thap	Chau Thanh	75	90	95	98	98
Hau Giang	Long My	70	85	92	91	95
Long An	Moc Hoa				59	
Long An	Tan Hung				70	
Long An	Tan Thanh				72	
Long An	Vinh Hung				60	
Tien Giang	Go Cong Dong	24	61	83		
Tra Vinh	Chau Thanh	75	91	95	84	86
Tra Vinh	Tieu Can	72	93	93	87	85

Table 2. Efficacy of Admire 050 EC demonstration (%)

Province	District	1 DAA	3 DAA	5 DAA	7 DAA	15 DAA
An Giang	Chau Phu	50	86	98	98	100
An Giang	Chau Thanh	70	85	89	89	85
An Giang	Thoai Son	78	87	92	93	93
Tien Giang	Go Cong Dong	72	94	94		
Long An	Vinh Hung - Thu Thua - Moc Hoa		54	73		

In 2006 wet season, a susceptibility test was carried out at Entomology Laboratory of CLRRI to examine the efficacy of some popular insecticides in use to control BPH in the Mekong Delta.

Four application rates included the recommendation rate were sprayed (Table 3) on filter-paper disk with 10 fifth-instar nymphs.

Our results shown that mortality of Lai Vung's BPH to imidacloprid 700WG, imidacloprid 10WP, buprofezin 10WP, fipronil 5SC and etofenprox 10EC were very low (16-62%) when treated at recomendation rate and higher rates (Table 4).

BPH population of Codo was died from 22% to 78% to imidacloprid 700WG, imidacloprid 10WP, buprofezin 10WP, fipronil 5SC and etofenprox 10EC when treated at higher recommendation rate (Table 5).

The susceptibility of Thanh Binh's BPH was the lowest to imidacloprid 700WG, imidacloprid 10WP, fipronil 5SC and etofenprox 10EC (0-35%) although treated at dose 4 (Table 6).

Most insecticides causes mortality of more than 50% when Triton BPH is treated at dose 3 but at 83-100% when it is treated at dose 4. However; imidacloprid 10WP, imidacloprid 700WG, buprofezin 10WP, fipronil 5SC, etofenprox 10EC were only effective to control BPH when treated at the higher dose than recommendation rate (Table 7).

Thotnot's BPH population was still susceptible to fenobucarb 50EC, buprofezin 10WP, fipronil 5SC and etofenprox 10EC except imidacloprid 10WP and 700 WG (Table 8).

Fenobucarb 50EC was most effective to control BPH in the Mekong Delta due to high mortality of all BPH populations.

In conclusion we can say that BPH populations in Lai Vung (Dong Thap) and in Co Do (Can Tho) were resisted to imidacloprid 700WG, imidacloprid 10WP, buprofezin 10WP, fipronil 5SC and etofenprox 10EC and only susceptible to Fenobucarb. While BPH population in Thanh Binh (Dong Thap) was resisted to imidacloprid 700WG, imidacloprid 10WP, fipronil 5SC and etofenprox 10EC and still susceptible to Fenobucarb and buprofezin.

BPH population in Tri Ton (An Giang) was also resisted to imidacloprid 700WG, imidacloprid 10WP, buprofezin and etofenprox 10EC at recommendation rate but less serious than other population. It is still susceptible to fenobucarb, fipronil.

BPH population in Thot Not (Can Tho) was only resisted to imidacloprid and still susceptible to other insecticides.

Table 3. Application rate of insecticides

Treatment	Dose 1	Dose 2	Dose 3	Dose 4
Imidacloprid 10WP (kg/ha)	0.2	0.4*	0.6	1.0
Fenobucarb 50EC (l/ha)	1.0	1.2	1.5*	2.0
Buprofezin 10WP (kg/ha)	0.7	1.0*	1.5	2.0
Imidacloprid 700WG (g/ha)	30	40*	50	60
Fipronil 5SC (l/ha)	0.1	0.2	0.3	0.5*
Etofenprox 10EC (l/ha)	0.5	0.7	1.0*	1.5
Untreated control check	water	water	water	water

*Recommendation rate

Table 4. Mortality of Lai Vung's BPH to insecticides (%) at 24 hours after application

Treatment	Dose 1	Dose 2	Dose 3	Dose 4
Imidacloprid 10WP (kg/ha)	0	8	12	62
Fenobucarb 50EC (l/ha)	100	100	100	100
Buprofezin 10WP (kg/ha)	1	12	30	62
Imidacloprid 700WG (g/ha)	0	5	17	32
Fipronil 5SC (l/ha)	0	0	1	16
Etofenprox 10EC (l/ha)	1	3	15	31
Untreated control check	0	0	0	0
LSD 0.05	1	13	19	32
CV %	58	33	27	40

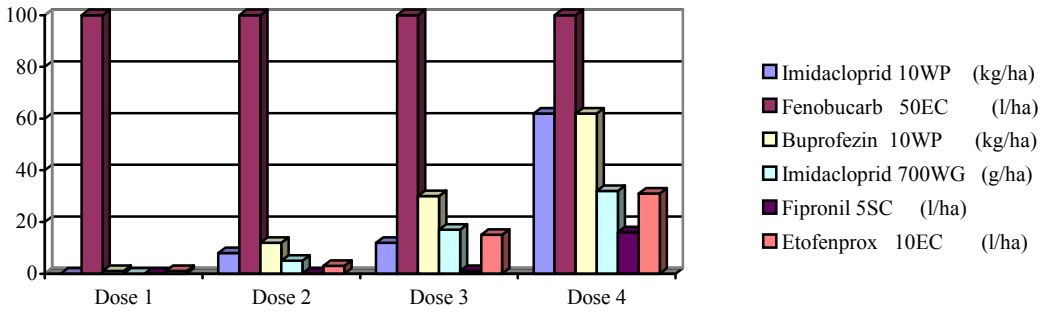


Table 5. Mortality of Co Do BPH to insecticides (%) at 24 hours after application

Treatment	Dose 1	Dose 2	Dose 3	Dose 4
Imidacloprid 10WP (kg/ha)	0	0	27	46
Fenobucarb 50EC (l/ha)	91	100	100	100
Buprofezin 10WP (kg/ha)	6	23	47	62
Imidacloprid 700WG (g/ha)	0	0	3	22
Fipronil 5SC (l/ha)	0	6	28	63
Etofenprox 10EC (l/ha)	8	27	38	78
Untreated control check	0	0	0	0
LSD 0.05	9	17	18	26
CV %	59	18	32	34

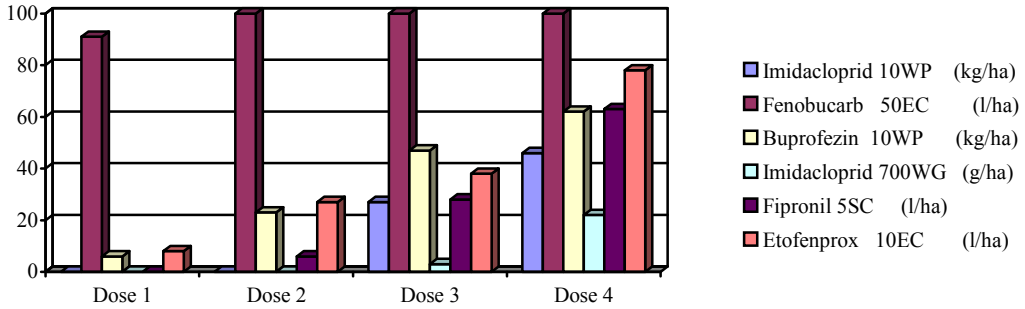


Table 6. Mortality of Thanh Binh BPH to insecticides (%) at 24 hours after application

Treatment	Dose 1	Dose 2	Dose 3	Dose 4
Imidacloprid 10WP (kg/ha)	0	0	0	0
Fenobucarb 50EC (l/ha)	100	100	100	100
Buprofezin 10WP (kg/ha)	5	26	91	100
Imidacloprid 700WG (g/ha)	0	0	0	25
Fipronil 5SC (l/ha)	0	0	7	35
Etofenprox 10EC (l/ha)	0	0	0	10
Untreated control check	0	0	0	0
LSD 0.05	6	21	12	26
CV %	42	43	89	25

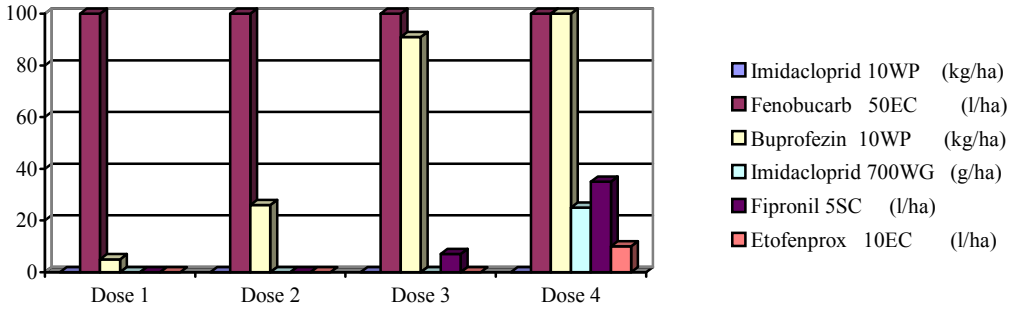


Table 7. Mortality of Tri Ton BPH to insecticides (%) at 24 hours after application

Treatment	Dose 1	Dose 2	Dose 3	Dose 4
Imidacloprid 10WP (kg/ha)	4	17	62	90
Fenobucarb 50EC (l/ha)	100	100	100	100
Buprofezin 10WP (kg/ha)	15	39	66	91
Imidacloprid 700WG (g/ha)	20	30	77	83
Fipronil 5SC (l/ha)	14	32	60	100
Etofenprox 10EC (l/ha)	13	38	75	87
Untreated control check	0	0	0	0
LSD 0.05	23	36	33	23
CV %	23	64	37	3

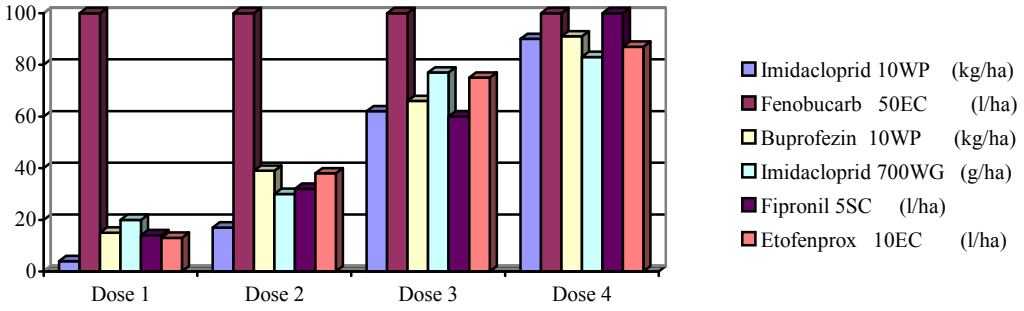
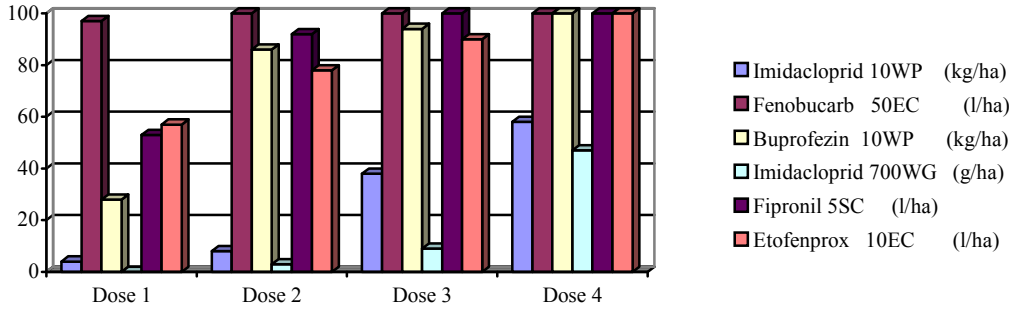


Table 8. Mortality of Thot Not BPH to insecticides (%) at 24 hours after application

Treatment	Dose 1	Dose 2	Dose 3	Dose 4
Imidacloprid 10WP (kg/ha)	4	8	38	58
Fenobucarb 50EC (l/ha)	97	100	100	100
Buprofezin 10WP (kg/ha)	28	86	94	100
Imidacloprid 700WG (g/ha)	0	3	9	47
Fipronil 5SC (l/ha)	53	92	100	100
Etofenprox 10EC (l/ha)	57	78	90	100
Untreated control check	0	0	0	0
LSD 0.05	28	22	18	20
CV %	78	76	71	47



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Tình trạng kháng thuốc của rầy nâu ở ĐBSCL

Diện tích nhiễm rầy nâu và trung bình về mật số trong quần thể rầy đã giảm so với 5 năm trước. Dịch rầy xuất hiện ở diện hẹp trong năm 2006 gây hại khoảng 210,000 hectares. Tháng 4 năm 2006, công ty hoá chất bảo vệ thực vật phát biểu rằng 2 loại thuốc hoá học diệt rầy gốc imidacloprid nếu sử dụng theo khuyến cáo 28 và 20 gram a.i./ha vẫn cho hiệu lực rất tốt trong việc kiểm soát rầy trong vụ Hè thu (2005-2006). Hầu như các loại thuốc hoá học đều cho hiệu quả trên 50% đối với dòng rầy nâu từ Tri Tôn, ở liều lượng 3 và tỉ lệ chết từ 83-100% khi sử dụng ở liều 4. Tuy nhiên, imidacloprid 10WP, imidacloprid 700WG, buprofezin 10WP, fipronil 5SC, etofenprox 10EC chỉ có hiệu lực khi sử dụng ở liều lượng cao hơn liều lượng đã được khuyến cáo.