

Effect of Crude Extracts from Plants on the Oviposition Behavior of Diamondback Moth

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Abstract: Semio-chemicals extracted from other non-preferred plants for the diamondback moth *Plutella xylostella* (L.) probably had good effect in controlling that pest. The extracts from 14 species of unacceptable plants by the DBM were used in the experiment of controlling the oviposition of the diamondback moth female. Most of the extract had good effect as oviposition deterrent for DBM female and the reduction percentage of eggs were more than 40%, even high to 65.52% at treatment of the extract from *Eucalyptus urophylla* after 24 hours of spray. The activity of oviposition deterrent reduced after 48 hours of spray.

Key words: *Plutella xylostella* (L.); semiochemical; oviposition deterrent

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The diamond back moth (DBM), *Plutella xylostella* (L.) feeds only on plants of Cruciferae. Many of the plants of Cruciferae are cultivated as vegetable and oil seed crops. Numerous crucifer plants not consumed by man, are considered weeds, and are also consumed by DBM when its favored hosts are absent and provide crucial link in maintaining DBM populations^[1]. Control of DBM by synthetic insecticides has become difficult because of its quickly developing resistance to these pesticides. The evolution of resistance of major insect pests were due to repeated and prolonged use of these chemicals^[2]. According to the report of Ankersmith^[3] that DBM had long history of eventually becoming resistant to every insecticide used extensively against it. In search for a human and environmentally safer approach to insect pest control, the use of insecticidal plants and biopesticide is becoming a popular alternative^[2]. The pressure of insecticide resistance has forced researchers to return to the principles of integrated pest management (IPM) that is, strategies involving the judicious use of insecticides in conjunction with other control measure. For the diamondback moth only eats the plants of Cruciferae, semio-chemicals from other non-preferred plants for the diamondback moth probably have good effect in controlling that pest.

1 Material and Method

The study was carried out in the green house at de-

partment of Entomology, South China Agricultural University, Guangzhou, from October 1, 2001 to January 2, 2002. Mature larvae and pupae were collected from the experimental fields of South China Agric. Univ. and brought to the laboratory for rearing the population of DBM. The larvae and pupae were kept in the separate cages measuring 60 cm×60 cm×60 cm. Fresh cabbage plants transplanted from the green house into the pots measuring 8 cm×5 cm and provided as a food to the larvae, nearly 20 pots / cage. For newly emerged DBM adults, 10 drops of honey mix with 10 mL of water impregnated on to the cotton wool in a petridish was also provided as a food in the cage.

The extracts used were from the following plants as *Eucalyptus urophylla*, *Manihot esculenta*, *Eupatorium odoratum*, *Lantana camara*, *Wedalia chinesis*, *Scoparia dulcis*, *Citrus reticulata*, *Aristolachia championii*, *Zanthoxylum schinifolium*, *Magnifera indica*, *Bidens pilosa*, *Nicotina tabaccum*, *Michelia alba* and *Lycopersicum esculentum*.

The seedlings of cabbage plants Caixin (*Brassica campestris* L. ssp. chinese var. utilis Tsen et Lee) grew for four weeks before experiment. The bed of green house was divided into ten equal parts and considered as replications, five considered as a control and five as a treatment. Each replication contained nearly 10 plants. The extract of dry leaves 0.5 g/mL water were prepared from different unacceptable plants by DBM female for oviposition. 0.5

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g/mL means the content was extracted from 0.5 g dry weight powder of the plants in the crude extract of 1 mL. The crude extract 1 mL/100 mL of water were made and mix well in a hand sprayer before applying and sprayed on the plants replicated as a treatment. More than 20 pairs of DBM adults were taken from rearing cages and released into the green house. Observation was taken after 24 hours and 48 hours, respectively. The data taken from randomly selected two leaves per plant and counted the number of eggs from treatment and control replications respectively. The duration between two experiments was one week.

2 Result and Discussion

The crude extract of different unacceptable plants by the DBM females for oviposition, sprayed on the cabbage plants in the green house to see the fecundity rate. The result showed varies considerably. Among all, the semiochemicals extracted from *Eucalyptus urophylla* and *Eupatorium odoratum* significantly reduced oviposition on treated plants in the result of after 24 hours. Those two semiochemicals gave the reduction percentage of eggs 65. 52 and 61. 69 respectively in Table 1.

Tab. 1 Effect of different semiochemicals on the fecundity of diamondback moth female in green house in 24 and 48 hours after treatment

species of plants	24 hours after treatment			48 hours after treatment		
	treatments / individual	control / individual	reduction of oviposition/ %	treatments / individual	control / individual	reduction of oviposition/ %
<i>Eucalyptus urophylla</i>	26. 0±10. 65	75. 4±15. 10	65. 52	34. 8±14. 8	65. 4±14. 36	46. 78
<i>Manihot esculenta</i>	24. 6±4. 28	44. 2±9. 39	44. 34	25. 2±9. 58	40. 2±15. 80	37. 31
<i>Eupatorium odoratum</i>	19. 0±3. 16	49. 6±15. 10	61. 69	21. 0±6. 70	44. 6±16. 60	52. 91
<i>Lantana camara</i>	28. 8±8. 70	50. 0±12. 39	42. 40	28. 4±10. 83	44. 2±10. 16	35. 75
<i>Wedalia chinensis</i>	29. 4±8. 41	50. 0±13. 28	41. 20	24. 0±9. 03	36. 0±9. 82	33. 33
<i>Scoparia dulcis</i>	27. 0±6. 12	55. 4±7. 33	51. 26	27. 6±6. 39	40. 6±5. 68	32. 02
<i>Citrus reticulat</i>	31. 4±5. 81	39. 2±11. 65	19. 89	30. 2±11. 26	34. 6±7. 73	12. 72
<i>Aristolachia championii</i>	22. 4±8. 68	41. 2±11. 21	45. 63	20. 2±6. 22	35. 0±8. 75	42. 28
<i>Zanthoxylum schinifolium</i>	27. 8±10. 80	58. 2±10. 03	52. 23	25. 8±7. 46	49. 2±7. 05	47. 56
<i>Magnifera indica</i>	54. 2±10. 94	68. 8±22. 84	21. 22	48. 6±9. 29	56. 8±12. 49	14. 44
<i>Bidens pilosa</i>	41. 0±1. 58	66. 2±4. 82	38. 07	54. 8±5. 26	83. 6±10. 94	34. 45
<i>Nicotina tabaccum</i>	44. 6±3. 65	84. 4±11. 22	47. 16	72. 2±6. 72	53. 8±4. 20	34. 20
<i>Michelia alba</i>	28. 4±26. 32	66. 0±37. 06	59. 97	35. 6±33. 06	56. 8±12. 49	37. 32
<i>Lycopersicum esculentum</i>	29. 0±26. 55	67. 6±12. 60	57. 10	70. 8±5. 63	80. 2±9. 04	11. 72

The result which was taken after 48 hours of the spray in Table 1 showed that among all the observations the extracts from the *Eupatorium odratum* compared with the other semiochemicals gave the good result, indicating that the chemical has residual activity as oviposition deterrent even after 48 hours and the oviposition reduction of DBM was 52. 91%. The plant treated with the extracts from *Zanthoxylum schinifolium* and *Aristolachea championii* also gave the good result and oviposition reduction percentage was recorded as 47. 56 and 42. 28 respectively . The extract from the plant *Lycopersicum esculentum* also had good effect on the DBM. In Table 1 the oviposition reduction was 57. 10% in 24 hours after treatment obviously higher than that in 48 hours after treatment. Cruciferous plants characteristically contain glucosinolates, that provide necessary oviposition stimulant to the female of DBM. The crude extract from the unacceptable plants, probably contains pun-

gent smell, which repells female for oviposition and also covers and weakens the olfactory and gustatory stimulant. Present result showed that *Eupatorium odoratum* had the residual activity in 48 hours after application. It is suggested that if the extract from the plant *Eucalyptus urophylla* contained the effective semiochemical that would be used as a oviposition deterrent of DBM.

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比较,结果发现同源性达到 90%以上,最高的同源性 为 98%。测序结果如下:

CACGGATATTGTATTCCTGGTCGTATATACTGTTTTCGAACGCAGTGCCGAGGCCTACGTGGTCTACATTTCCAGCAGT
TTGTAGTCTCAGCCACAGCTGATTTCTTTTGTGTTTGGTTGGAAGTAATCAATAGTGGAATCTAGGACAGGTTTGGGG
GTAAAGTAGCGGGAGTGCTAGGAGAAGGGCTGGGTTATGGTATGGCGGGAGGAGTAGTTTACATAGGGGTCATAGGTGA
GGGCTGTGGCCTTTGTTACAAAGTTATCATCTAGAATAACAGCACTGGAGCCCACTCCCCTGTACCCTGGGTGATCGG
GGAGCAGGGCCAGAATTCAACCTTAACCTTTCTTATCTGTAGTATTCAAAGGGCACAGAGCGGGGGTTTGAGCCCCCT
CCTGGGGGAAGAAAGTCATTAATATTGAATCTCATCATGTCCACCGCCAGGAGGGCGTTTTGACTGTGGTTCGCTTGA
TAGTATATCCGAAGGTGCGG.

3 讨论

猪圆环病毒 2 型是最近几年才发现的 1 种新病毒,它主要造成机体的免疫抑制,机体抵抗力下降.继发感染其他病原体会导致仔猪大批死亡,给养猪业造成巨大的损失.本次检测发现所检测的 20 个猪场 PCV2 均为阳性(100%),由此可见本病毒已严重影响了广东省养猪业的发展.本方法的建立,为流行病学及疫苗的研究打下了基础.

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A PCR Method for Testing Porcine Circovirus 2

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Abstract: According to the published gene sequence of PCV2, two primers were designed. The sequence was amplified from suffering piglets sample got from 20 farms in Guangdong using PCR. The PCR products were cloned into pMD18-T easy vector, and the recombinant plasmid identified by PCR, restriction enzyme analysis and sequencing. It was found that all of the samples were positive.

Key words: testing; PCV2; PCR method

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多种植物提取物对小菜蛾产卵的驱避作用

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摘要: 小菜蛾仅取食为害十字花科植物. 其他非嗜食植物的提取物对小菜蛾可能有好的控制作用. 在温室室内试验研究了 14 种常见植物的提取物对小菜蛾雌虫的产卵驱避作用. 绝大部分供试植物的提取物可减少小菜蛾的落卵量 40% 以上, 作用最强的是尾叶桉的抽提物, 喷施 24 h 后卵降低率达 65.52%. 植物提取物对小菜蛾雌虫的产卵驱避作用 48 h 后下降, 卵减少率最高为飞机草的抽提物, 达 52.91%. 非嗜食植物次生物质在小菜蛾的控制中会有良好的前景.

关键词: 小菜蛾; 植物提取物; 产卵驱避

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