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B&B e-Paper No. 10:

## **Biofertilizers and Biopesticides (B&B) for Sustainable Agriculture No. 10**

### **Irresistibly attractive- Pheromones**

When a chemical substance acts on the same species to change or stimulate certain behaviors, it is called "pheromones", while those act on different species are called "allelochemicals". The use of pheromone can be used as a tool for monitoring, sampling and investigating the population dynamics of insect pests in the field. When the pest density reaches the economic threshold, the control technologies such as chemical control, biological control and physical control will be started, and the application of pheromone is also one of the integrated pest management (IPM).

At present, more than 2600 species of pheromones have been identified. Among them, sex pheromones are the most common species, about 1410 species, and lepidoptera is the main control target. The pheromone product can be used to lure, repel or copulate insects after natural diffusion and volatilization. The toxic mechanism of pheromone is different from of chemical pesticides. The use of insect pheromone is a technology of IPM, which has the characteristics of non-toxic, non-residue, species specificity and trace amount. Due to the specificity of insect pheromone, it is necessary to identify the "pest species" target and adopt regional joint control. If it is used continuously, the control effect will be better.

Started from 1976, the Taiwan Agricultural Chemicals and Toxic Substances Research Institute, COA has been implementing the "study on the technique of large-scale rearing and pheromone bioassay of mealybug in Guava (Citrus)" for more than 30 years. 29 kinds of important pests' pheromones were developed, such as mealybug, corn borer, sweet

potato weevil, beet armyworm, *Eucosma meyrick*, *Conopomorpha bradley*, *Bactrocera dorsalis*, *Spodoptera litura*, *Lymantria xyliana*, thrips and aphids, etc (see Table 1). It can be used in the control of grain, vegetable, fruit tree, horticulture and grain accumulation pests. We have developed a variety of trapping systems and technologies such as sex pheromone, aggregation pheromone, guard pheromone and other pest trapping and killing functions, and promoted them to farmers as pest management applications.

Table 1. Materials and control techniques of pheromone / attractant developed in Taiwan.

No.	Type of Pheromone	Target pest	Validity Period (month)
1	Alarm Pheromone of <i>Thrips</i>	<i>Thrips</i>	6
2	Sex Pheromone of <i>Cylas formicarius</i>	<i>Cylas formicarius</i>	1
3	Sex Pheromone of <i>Cydia notanthes</i>	<i>Cydia notanthes</i>	6
4	Sex Pheromone of <i>Grapholita molesta</i> / <i>Cryptophlebia ombrodelta</i>	<i>Grapholita molesta</i> / <i>Cryptophlebia ombrodelta</i>	6
5	Sex Pheromone of <i>Spodoptera litura</i>	<i>Spodoptera litura</i>	1
6	Sex Pheromone of <i>Spodoptera exigua</i>	<i>Spodoptera exigua</i>	1
7	Sex Pheromone of <i>Plutella xylostella</i>	<i>Plutella xylostella</i>	2 - 3
8	Sex Pheromone of <i>Chilo suppressalis</i>	<i>Chilo suppressalis</i>	1-2
9	Sex Pheromone of <i>Ostrinia furnacalis</i>	<i>Ostrinia furnacalis</i>	1-2
10	Sex Pheromone of <i>Adoxophyes</i> sp.	<i>Adoxophyes</i> sp.	3-4
11	Sex Pheromone of <i>Lymantria xyliana</i>	<i>Lymantria xyliana</i>	2
12	Sex Pheromone of <i>Orgyia Postica</i>	<i>Orgyia Postica</i>	2
13	Sex Pheromone of <i>Epehstia cautella</i>	<i>Epehstia cautella</i>	3-4
14	Sex Pheromone of <i>Plodia interpunctella</i>	<i>Plodia interpunctella</i>	1
15	Sex Pheromone of <i>Chilo sacchariphagus</i>	<i>Chilo sacchariphagus</i>	1
16	Sex Pheromone of <i>Etiella behrii</i>	<i>Etiella behrii</i>	1
17	Sex Pheromone of <i>Planococcus minor</i>	<i>Planococcus minor</i>	2-3
18	Sex Pheromone of <i>Planococcus citri</i>	<i>Planococcus citri</i>	2-3
19	Sex Pheromone of <i>Conopomorpha sinensis</i> Bradley	<i>Conopomorpha sinensis</i> Bradley	1
20	Sex Pheromone of <i>Helicoverpa armigera</i>	<i>Helicoverpa armigera</i>	1
21	Sex Pheromone of <i>Sesamia inferens</i>	<i>Sesamia inferens</i>	1
22	Sex Pheromone of <i>Trichoplusia ni</i>	<i>Trichoplusia ni</i>	1
23	Sex Pheromone of <i>Etiella zinckenella</i>	<i>Etiella zinckenella</i>	1
24	Toxic <i>Methyleugenol</i>	<i>Bactrocera dorsalis</i>	2
25	<i>Methyleugenol</i>	<i>Bactrocera dorsalis</i>	1 - 2
26	<i>Cuelure</i>	<i>Bactrocera cucurbitae</i>	2 weeks
27	<i>Isalon</i>	<i>Bactrocera dorsalis</i> / <i>Bactrocera cucurbitae</i>	2 weeks
28	Mating disruptants of <i>Cydia notanthes</i>	<i>Cydia notanthes</i> / <i>Grapholita molesta</i> / <i>Cryptophlebia ombrodelta</i>	5
29	Mating disruptants of <i>Spodoptera exigua</i>	<i>Spodoptera exigua</i>	3



Figure 1. Pheromone bait products.



Figure 2. Trap of insect sex pheromone.



Figure 3. Using integrated pest control with the mixture of sex attractant and fenazone (10:1) to trap and kill fruit fly.

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