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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

化学信息物质的应用

IIT-昆虫的信息技术

Application Technology of Semiochemicals

IIT - The Insect Information Technology

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Semiochemicals, the insect language
信息化学物质，昆虫的语言

Semiochemical, from the Greek σημεῖον (semeion) meaning "signal," is a generic term used for a chemical substance or mixture that carries a message for purpose of communication.

化学信息物质一词源于希腊语的Semeion，意为信息、信号。化学信息物质是一种携带着用于交流的信息的物质或混合物。

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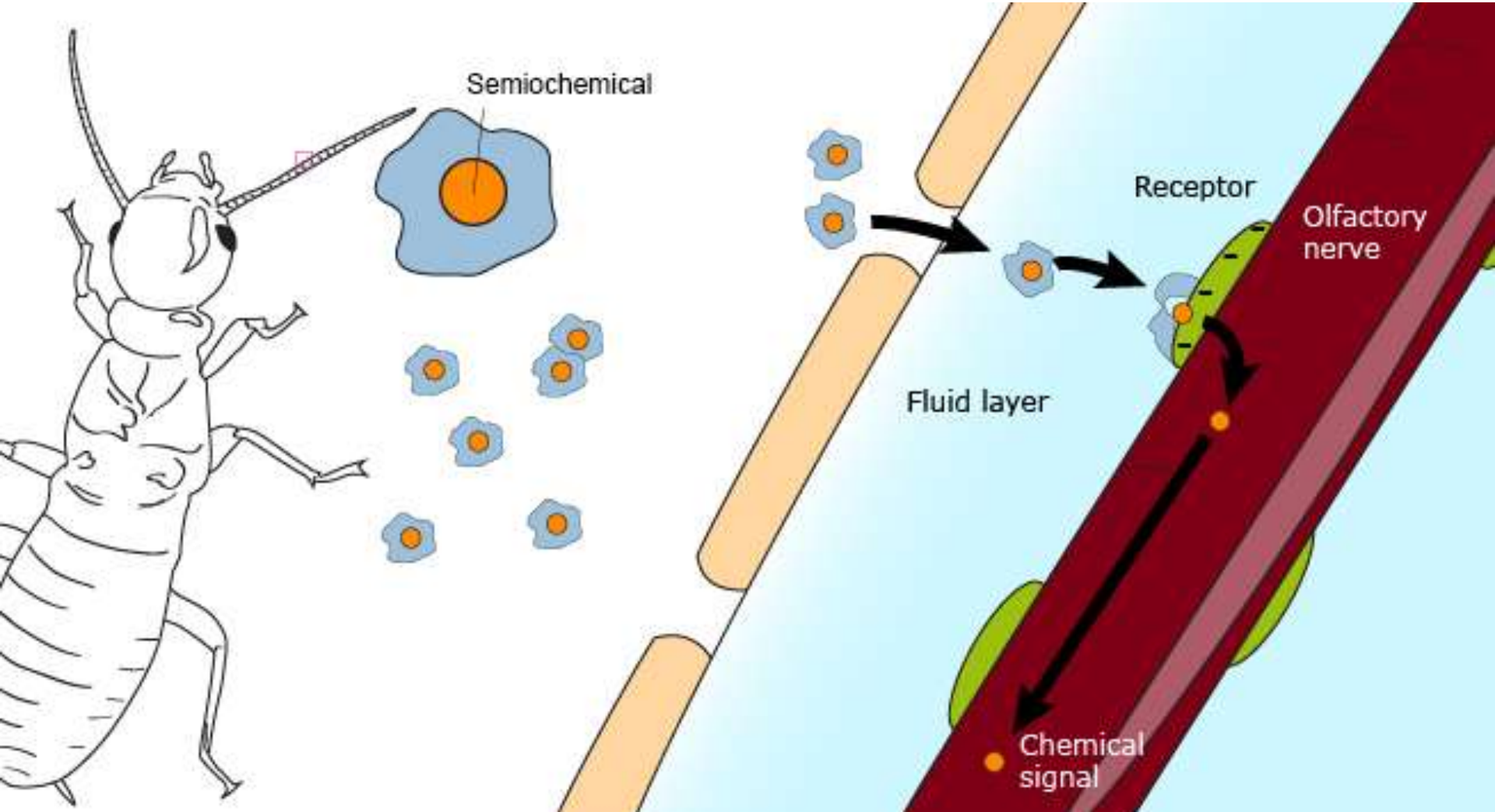
Semiochemicals, the insect language
信息化学物质，昆虫的语言

Semiochemicals>Antenna>Nerve>Information

化学信息物质> 触须（接收器官）> 神经系统> 信息转化



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Semiochemicals, the insect language
信息化学物质，昆虫的语言

Semiochemicals
化学信息物质

Pheromone: Alarm, Food, Mating (Intraspecies)
信息素：告警、食物、性信息素（种内）

Kairomone: Benefits the receiver (Interspecies)
利它素：对信息接受者有益（种间）

Allomone: Benefits the emitter (Interspecies)
利己素：对信息释放者有益（种间）

Attractants: Botanical; Food (Interspecies & Intraspecies)
引诱剂：植物、食物（种间和种内）

Repellents: Botanical; Irritants (Interspecies & Intraspecies)
驱避剂：植物、刺激剂（种间和种内）

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Semiochemicals, the insect language
信息化学物质，昆虫的语言

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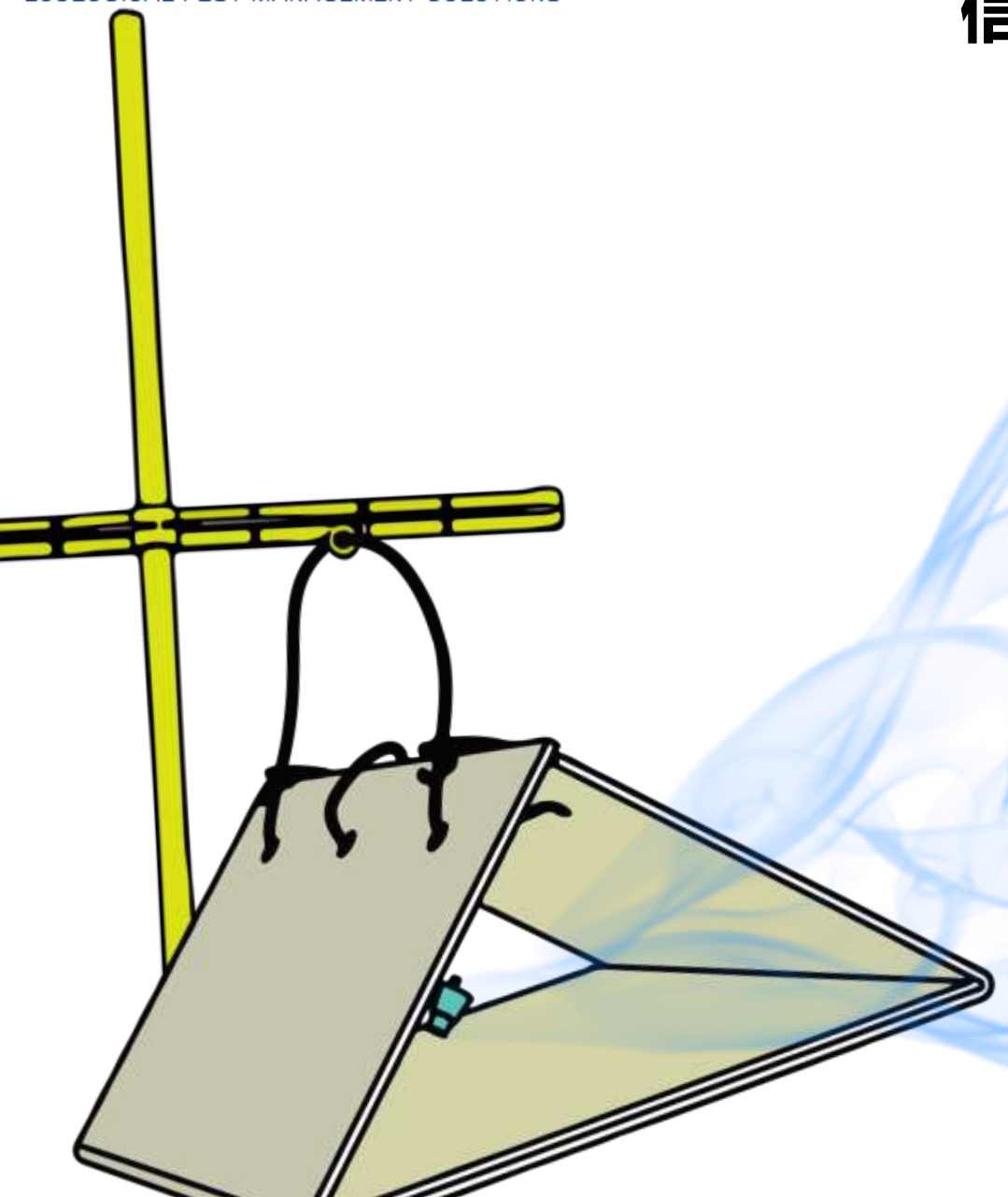
Sex Pheromone Trapping
信息素技术：信息素诱捕



Monitoring or mass trapping, with pheromone lure and trap.

使用信息素诱芯和诱捕器进行监测和诱杀。

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Sex Pheromone Trapping
信息素技术：信息素诱捕

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Sex Pheromone Trapping
信息素技术：信息素诱捕

Benefits
优势

- Environmental Friendly
  环境友好
- Estimate Population
  监测虫口密度
- Species Specific
  种专一性
- Compatibility - Chemical Pesticide
  和化学农药不冲突
- Resistance Free
  不会产生抗性

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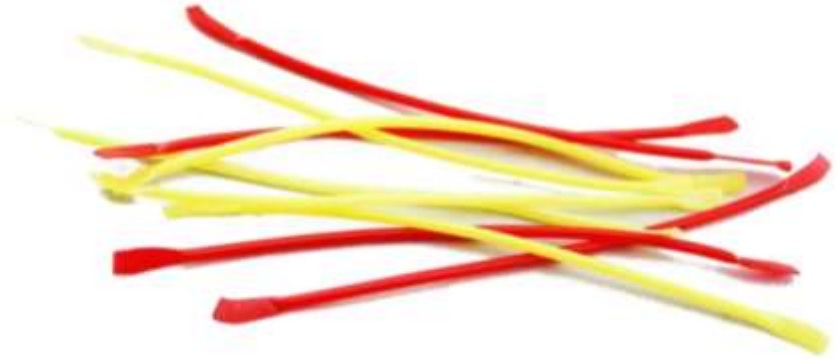
Sex Pheromone Trapping
信息素技术：信息素诱捕



Pheromone carriers. AKA, pheromone lures.
信息素载体，也称作诱芯。

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Sex Pheromone Trapping
信息素技术：信息素诱捕

Wing Trap

McPhail

Vertical Trap

SLIT Trap

Delta Trap

EAB Trap

Longhorn Beetle Trap

Bucket Trap

Traps are containers which have various forms and that is for the differences of insect behaviors.
诱捕器是形态各异的昆虫容器，他们以昆虫的不同行为来设计。

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Sex Pheromone Trapping
信息素技术：信息素诱捕

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Sex Pheromone Trapping
信息素技术：信息素诱捕

Application Technology
施用技术

Monitoring: Stay alert to the presence
监测：对发生状况有所了解

Mass Trapping: Decrease adult population
大面积诱杀：减少成虫的数量

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Sex Pheromone Trapping
信息素技术：信息素诱捕

CASE STUDY: FORESTRY PEST EARLY DETECTION
案例：林业害虫早期监测

Dioryctria splendidella

Agrilus planipennis

Grapholita molesta

Hyphatria cunea

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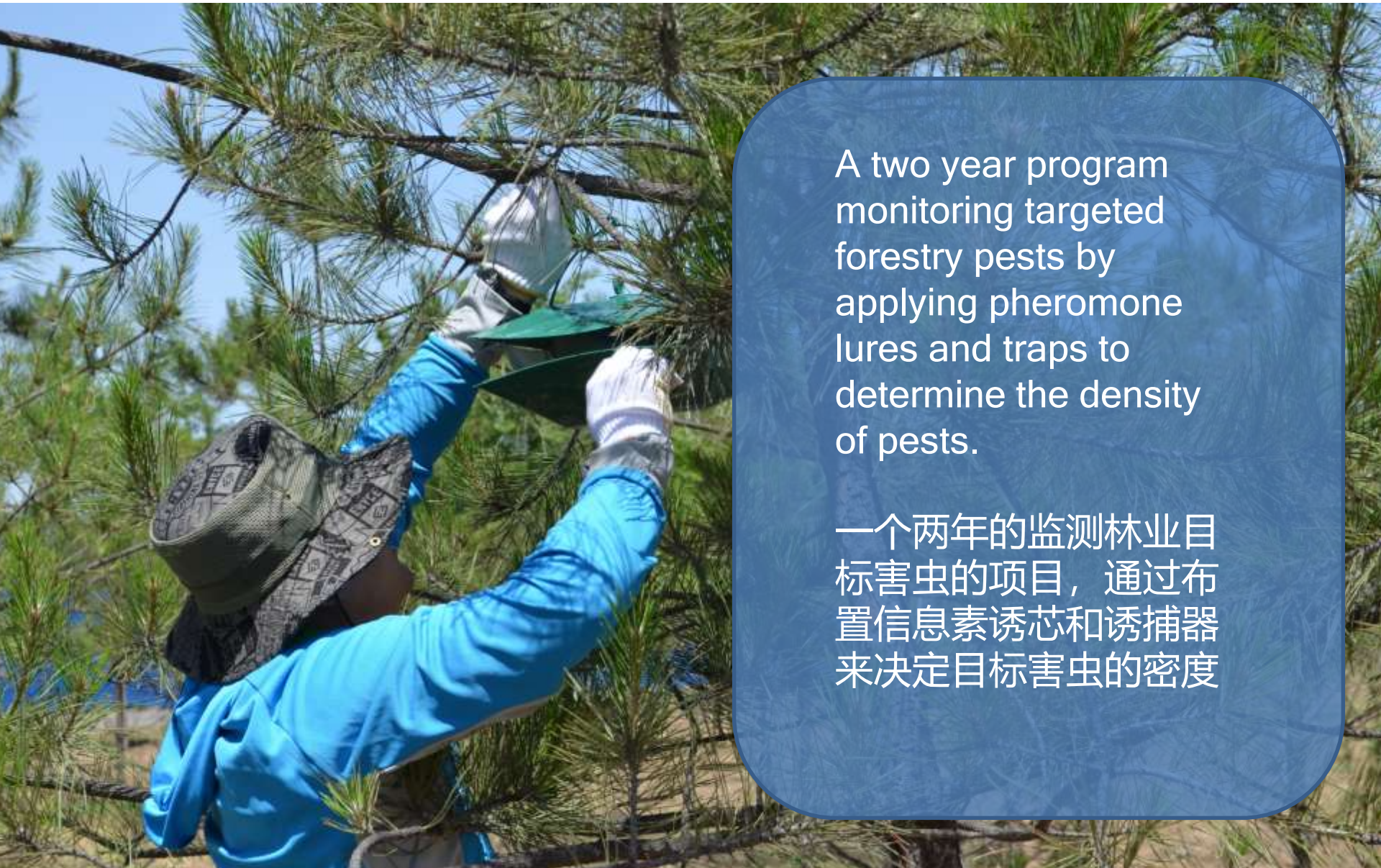
Sex Pheromone Trapping
信息素技术：信息素诱捕



A two year program monitoring targeted forestry pests by applying pheromone lures and traps to determine the density of pests.

一个两年的监测林业目标害虫的项目，通过布置信息素诱芯和诱捕器来决定目标害虫的密度

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Sex Pheromone Trapping
信息素技术：信息素诱捕

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Agrilus planipennis

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Sex Pheromone Trapping
信息素技术：信息素诱捕

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Sex Pheromone Trapping
信息素技术：信息素诱捕

Hyphantria cunea

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Sex Pheromone Trapping
信息素技术：信息素诱捕

None Detected Low Moderate High Severe No Data

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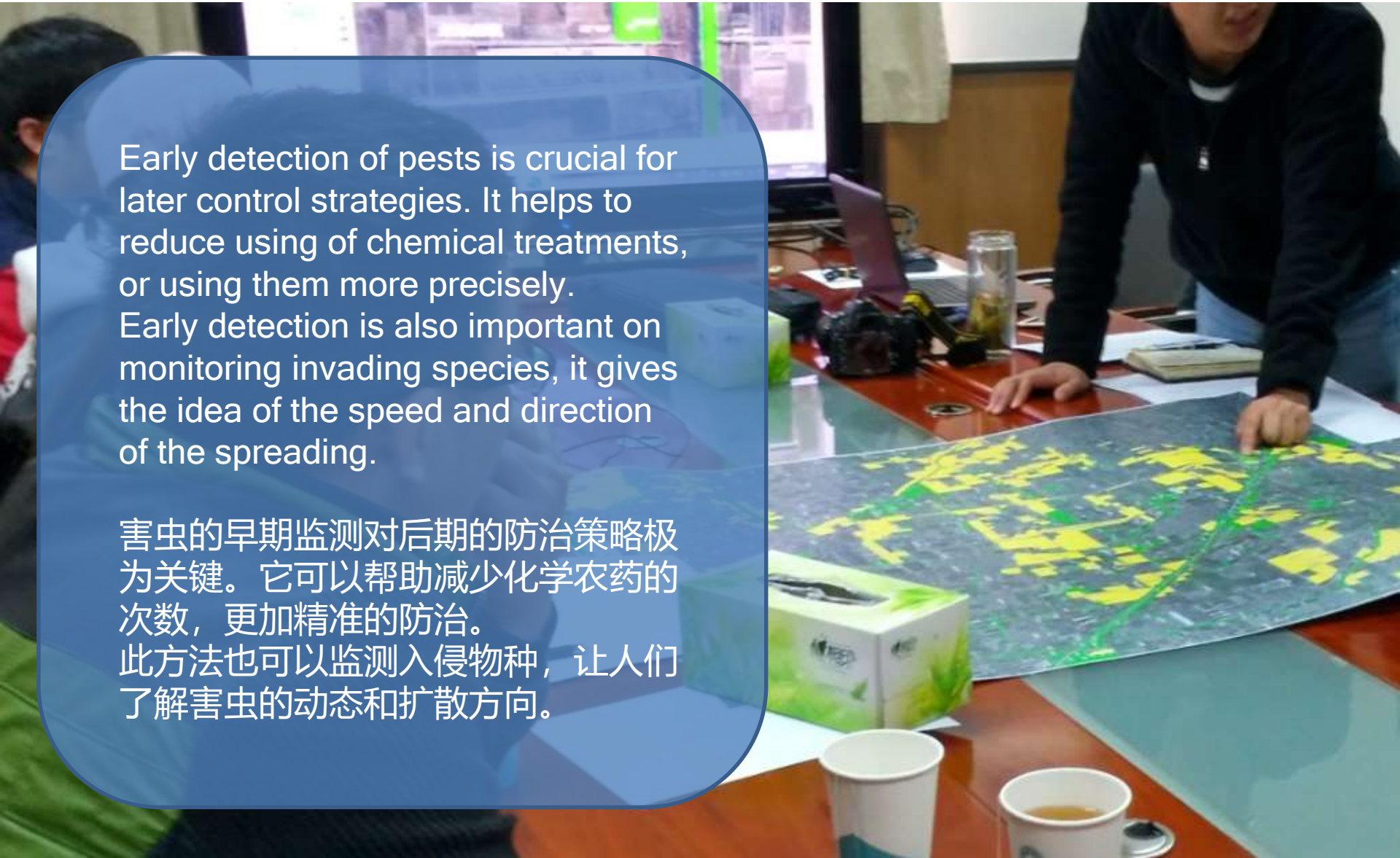
Sex Pheromone Trapping
信息素技术：信息素诱捕



Early detection of pests is crucial for later control strategies. It helps to reduce using of chemical treatments, or using them more precisely.
Early detection is also important on monitoring invading species, it gives the idea of the speed and direction of the spreading.

害虫的早期监测对后期的防治策略极为关键。它可以帮助减少化学农药的次数，更加精准的防治。
此方法也可以监测入侵物种，让人们了解害虫的动态和扩散方向。

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Control population by releasing highly concentrated synthetic pheromone and block mating process.
释放大量的合成信息素来阻断交配过程，从而控制害虫数量。

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

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Sex Pheromone Mating Disruption
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Sex Pheromone Mating Disruption
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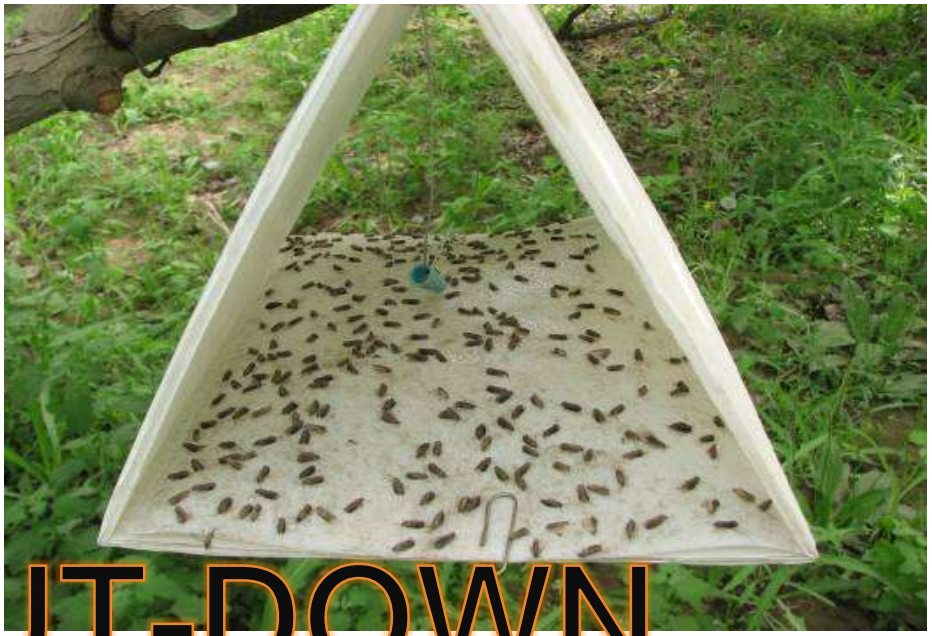
Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Comparison on two areas with and without mating disruption dispensers. The left picture shows that no OFM catch in traps, which states that OFM in the area has been disrupted by dispensers, thus can't find the source of female sex pheromone.

迷向区域和非迷向区域的对比。
左边的图片中的诱捕器中没有捕捉到梨小食心虫，这说明区域中的梨小食心虫已经被干扰，进而无法找到雌性释放出的信息素。



TRAP SHUT-DOWN

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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Benefits
优势

- Excellent Approach - Proactive protection
  极好的主动性 - 先发制人的防治措施
- Residue & Resistance Free
  无残留和抗性
- Species Specific - Spare beneficials, only control the targets
  种专一性 - 不会误伤益虫等，仅对目标有效
- High Efficacy - Season long control, faster application
  极高的效率 - 覆盖整个生长季的防治，更快的施用方式
- Environmental Friendly - No risks to soil & water
  环境友好 - 对土壤和水源没有威胁

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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Application Technology
施用技术

Density: 500-550 dispensers per Hectare
用量：500-550 散发器每公顷

Field Life: 4-6 month per application
持效期：每次施用可持续4-6个月

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Eficacia de BRAND LURE FEROMATE™ para la confusión sexual de *Lobesia botrana* en una viña de la Región de O´Higgins, Chile.

Efficacy of BRAND LURE FEROMATE™ for the sexual confusion of *Lobesia botrana* in vineyard in the O'Higgins Region, Chile.

FEROMATE™产品在智利O’Higgins地区的葡萄园中，对*Lobesia botrana*的迷向田间效果。

FDF

ASOEX
ASOCIACIÓN DE EXPORTADORES DE FRUTAS DE CHILE A.G.
"Juntos, nuestra fruta vale más"

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Lobesia botrana, AKA the European grapevine moth. The larvae mainly feed on the flowers and fruit of grape (*Vitis vinifera*).

*Lobesia botrana*也被称作欧洲葡萄蛀果蛾。它的幼虫主要食用酿酒葡萄（*Vitis vinifera*）的花朵和果实。

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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Lobesia botrana is considered a major vineyard pest as the larvae feed on the interior of grapes, hollow them out and leave excrements.

*Lobesia botrana*是葡萄上的一种主要害虫，它的幼虫在葡萄内部进食，导致葡萄中空，并且会留下粪便。

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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

INTRODUCTION

Since its detection in Chile in 2008, the EGVM (*Lobesia botrana*) is a pest under mandatory legal control. The management of this plague is under the supervision of the Agricultural and Livestock Service (SAG) for the cultivation of vines, cranberries and plums. Feromate™ is a technology of sexual confusion developed by Pherobio, which is recommended for the control of *L. botrana* in doses of 500 dispensers / ha. The evaluation of new alternatives of sexual confusion for this pest requires official field trials following a protocol prepared by the SAG and executed by local experts authorized for its implementation. This report describes the main results of an official field trial conducted with the cage male release protocol for the evaluation of the sexual confusion of L. botrana during the 2017-2018 season in the O'Higgins Region, Chile.

简介

自2008年第一次在智利发现*Lobesia botrana*以来，对此防治已经成为强制性。现在是由SAG（智利农业部）来监督对此害虫在葡萄、蓝莓和李子的种植区的管理。由中捷四方生产的迷向丝建议用量为500条/公顷，对于此产品的评估需要执行一个由SAG定制的方案，并且由官方授权的专家来执行。以下内容是根据授权方案来执行的*Lobesia botrana*迷向实验，时间为2017/2018季度，执行地点为O'Higgins地区，智利共和国。

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

MATERIALS AND METHODS

Study site: The field trial was conducted in the Los Negros del Fundo Ranguil sector of the San Rafael vineyard of Via Wines, located in Lolol, O'Higgins Region (34 ° 53 'S, 71 ° 42' W), Chile. A sector of the barracks 56 (4.4 ha) and 57 (4.0 ha) of Cabernet Sauvignon vines.The treatments evaluated were: i) Mating disruption with Feromate™ and ii) application of authorized insecticides. A control treatment without application can not be included in the trial, due to legal restrictions that do not allow unmanaged areas for this pest.

实验材料和方法

执行地点：大田实验在O'Higgins地区执行（南纬34°53'；西经71° 42'），Via红酒公司的圣拉斐尔葡萄田。使用的区域为葡萄田中的56号（4.4公顷）和57号（4.0公顷）片区，片区中葡萄品种均是解百纳。

实验设计：实验评估的项目为：1）诱尔牌迷向散发器，和2）被准许使用的杀虫剂。因法规的限制，使用的产品和实验的地点均为官方授权的。

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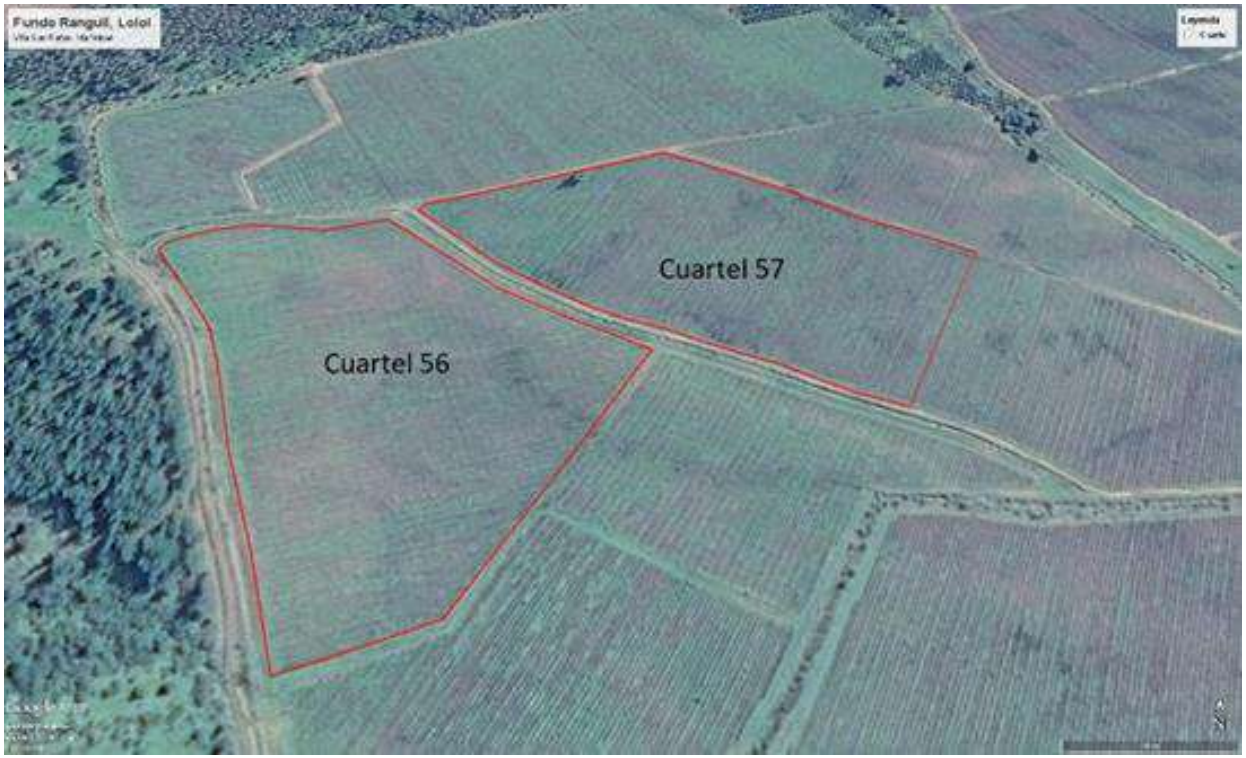
Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）



Two quarters of approximately 4 ha were used as an experimental unit, where 4 cages were installed. Treatment 1 BRAND LURE Feromate™ was used in the barracks 57 while treatment 2 (authorized insecticides) was used in barracks 56.

两块约4公顷的土地被用来做实验，每块地布置了4个笼子。在下面的图示一中可以看到， 迷向产品被用在57号区域，杀虫剂用在56号区域。

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

The cages were constructed following the instructions described in Hoffmann & Doye (2017), with dimensions of 3 x 2 x 2.5m considering a double door section. They were built in metal profile and covered with metal mesh. The cages were installed along the trellis and contained two vines in its interior.

笼子根据Hoffman & Doye在2007年描述的方法来建造，尺寸为3*2*2.5米并且有一个双门区域。笼子为钢架结构，以金属网为墙，顺着葡萄架安装并且每个笼子含有2个葡萄树。

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

The virgin males and females of *L. botrana* used in the trial came from the authorized breeding maintained by the Foundation for Fruit Development (FDF) in Quilicura. The virgin males and females (2-3 days from the emergence) were transported cold conditions (approximately 4-5 ° C) to the field. The males were transported in transparent plastic containers of 700 cc with a cotton swab soaked in distilled water. The virgin females were transported in pairs inside metallic mesh capsules.

在此次实验中使用的处子雄性和雌性*L. botrana*由在基利庫拉的FDF提供。雄性和雌性处子昆虫为2-3天的新生成虫，由4-5℃的冷链运输至试验田。雄性由700cc的塑料容器运输，容器里装了少量的浸水棉球。雌性由金属网容器成对运输。

At each release, a delta trap was installed in each cage, which was primed with a metal mesh capsule containing two virgin females. The traps were inspected every 3-5 days for three weeks, replacing the dead virgin females in each revision. Traps with suspicious catches were removed at the end of inspections and sent to SAG O'Higgins for taxonomic confirmation.

每一次释放，笼子里都会布置一个三角诱捕器，每个诱捕器都装有一个含有2只雌性处子实验体的小网笼。诱捕器每3-5天检查一次，并且替换掉死亡的雌性实验体。诱捕器中未知、或错误的抓捕品种都被移除并发往在O’Higgins的SAG中心进行鉴定。

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

RESULTADOS Y DISCUSIÓN
RESULTS AND DISCUSSION
实验结果和讨论

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

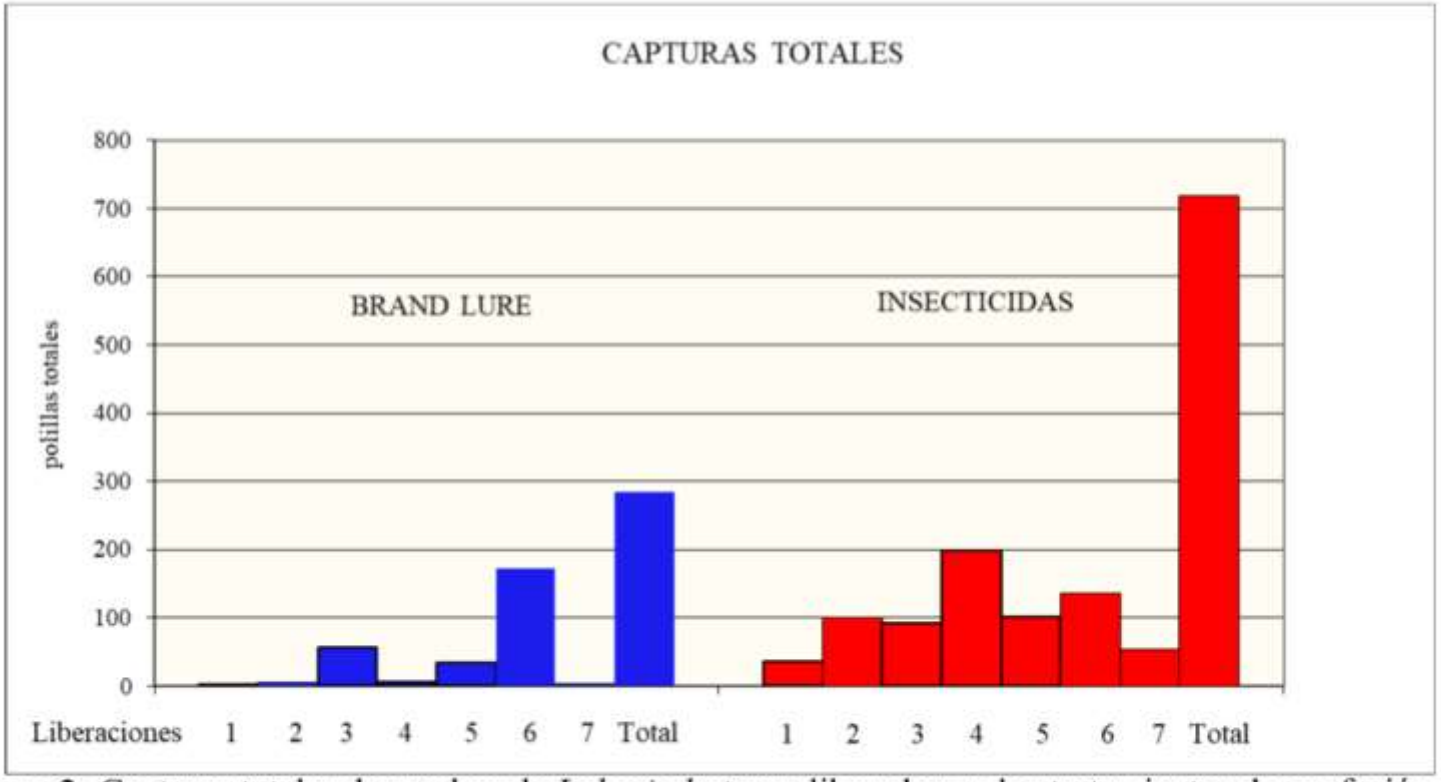

Figura 2: Capturas totales de machos de *Lobesia botrana* liberados en los tratamientos de confusión sexual con BrandLure e insecticidas autorizados en el Fundo Ranguil, Lolol, Chile, temporada 2017-2018.

The catches of males released in the L. botrana cages were variable throughout the season for each treatment (Figure 2). However, the total catches in the insecticide treatment were higher than those of the sexual confusion treatment with dispensers (Figure 2).
在不同季节里每个笼子的雄性捕捉量也都不同。但是，由杀虫剂处理的区域的抓捕量高于又迷向处理的区域。（图示二）

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Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

CONCLUSIONES

1.- Las jaulas en el cuartel con confusión sexual con Brand Lure en dosis de 550 emisores/ha mostraron disminución significativa de captura de machos adultos de *Lobesia botrana* en comparación con las parcelas tratadas con insecticidas, por lo tanto se considera que este producto puede controlar esta plaga, en forma variable asociado a las condiciones de temperatura y viento, por un periodo de 150 días.

CONCLUSIONS

The cages in the barracks with sexual confusion with BRAND LURE FEROMATE in a dose of 500 emitters / ha showed a significant decrease of capture of adult males of *Lobesia botrana* in comparison with the plots treated with insecticides, therefore it is considered that this product can control this pest, in variable form associated with the conditions of temperature and wind, for a period of 150 days.

总结

BRAND LURE FEROMATE迷向散发器使用于500根/公顷时，同杀虫剂相比可以显著减少雄性实验体的诱捕数量。所以，我们认为他可以作为防治*Lobesia botrana*的产品。此产品效果和温度及风量有显著关系，并且持效150天。

PHEROBIO
ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Sex Pheromone Mating Disruption
信息素技术：迷向（干扰交配）

Perspective
前瞻

"Mega blockade" dispensers with much lower density: from 500 to 80 dispensers per hecatare.
超低用量的"巨型散发器"：每公顷仅80个

Extended Field Life up to 8-10 month per application
加长持效期：每次施用可持续8-10个月

"Mixer" Type: Dispensers for multiple species, ie *Chilo, Spodoptera, Helicoverpa, Cydia.*

混合型散发器：可应对多种类的害虫

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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Overview
概览

Established in 2003, Pherobio is the first company engaged in insect pheromone research and development, production and marketing in China.

中捷四方始于2003年，是中国最早的昆虫信息素研究、发展，生产和营销的公司。

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Overview
概览

Pherobio's subsidiary XiangLin Agri-Biotech has a team consists of various highly specialized researchers including chemists, entomologists, biologists and chemical ecologists who are experienced in pheromone synthesis and formulating, application technology development and integrated pest management.

我们的工厂—翔林农业科技有限公司的团队由各种高度专业化的研究人员组成，包括化学家，昆虫学家，生物学家和化学生态学家，他们在信息素合成和配方，应用技术开发和病虫害综合管理方面经验丰富。

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ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Overview
概览

Inside the facility, 28 ton-class reactors. Two pilot plants.
Pherobio's wholly owned factory possesses one of the world's largest pheromone synthesis production line.
在该设施内，28个吨级反应釜和两个中试车间。
中捷四方的全资工厂拥有世界上最大的信息素合成生产线之一。

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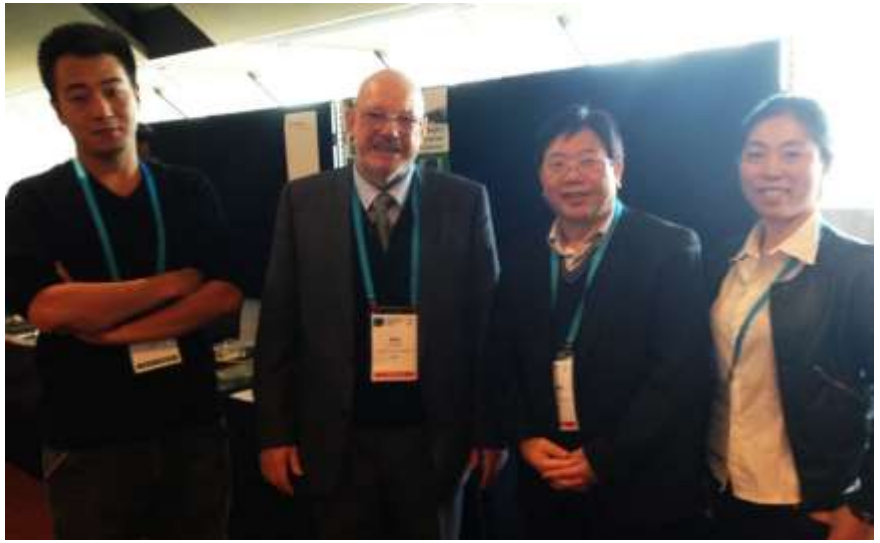
ECOLOGICAL PEST MANAGEMENT SOLUTIONS

Overview
概览

Proud member of the APACE—Asia-Pacific Association of Chemical Ecologists.
我们还是APACE—亚太化学生态学会的荣耀会员。



1997
Asia-Pacific Association of Chemical Ecologists

INTERNATIONAL SOCIETY OF CHEMICAL ECOLOGY
ISCE


Ecological Control
For The Planet.
Thank you!
www.pherobio.com
info@pherobio.com