

ECOMAN BIOTECH'S – FRUIT FLY CONTROL & SMART PEST MONITORING PRODUCTS

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Sweta
International Business Dept.
Beijing Ecoman Biotech Co. Ltd.

WHO WE ARE



ECOMAN AT A GLANCE

Pest control broadens smiles of orange farmers

By Laxman Kalle
Kathmandu, Jan. 9

Orange farmers of Sindhuli district have breathed a sigh of relief after successfully controlling the pest that used to damage their fruit every year.

The Prime Minister Agriculture Modernisation Project, Sweet Orange Super Zone and farmers have finally succeeded to curb the problem after a two-year-long combat against the notorious pest.

Lok Bahadur Ale, one of the sweet orange farmers of Golanjor, Gaupalika-4, Tinkanya, is ecstatic after being able to protect his farm from potential danger.

"My family is now happy with the income from sweet oranges. We are able to not only have two meals a day but live a better life thanks to booming orange sales. A son of porter, I am now able to ride a motorcycle," he said.

Ale said that the infestation did not damage more than five-six per cent of their fruit this year. "I never thought we could save our crops from pests," he said.

Ale had, once even

thought of giving up the occupation of orange farming owing to burdensome infestation. But now the situation is different. "The infestation is now brought under control with the use of pesticides. This has made me more hopeful about my occupation," he said.

Ale is earning around Rs. 800,000 to Rs. 1,000,000 annually from sweet orange for the last two years while the income was limited to below Rs. 200,000 three years ago.

Now, around 620 sweet orange trees are standing in his 22 ropanis of land. Out of them, 500 trees yield fruit, he said.

With the growing production, Ale constructed a cold storage in his own home.

"I have planned to store about 50 quintals of sweet oranges produced in my garden targeting to sell in off-season when the price of orange goes up," he said.

The damage caused to sweet orange by Chinese Citrus Fly (CCF) has been on rise since 2014 in the central hilly citrus orchards of Sindhuli and Ramechhap.

Price falls significantly

Another sweet orange farmer, Brij Bahadur Gaudashe Magar said that his income swelled from sweet orange crop after the pest infestation was brought under control.

According to him, he will sell sweet orange worth Rs. 600,000 this year. He has around 500 sweet orange trees in his garden.

"Almost 90 per cent yield used to be damaged due to the diseases a couple of years ago. Now, the production loss dropped to five per cent thanks to the Area Wide Control Programme (AWCP) of CCF," he said.

Most of the farmers of Tinkanya are earning around Rs. 300,000 to Rs. 1.4 million annually by selling oranges, he said.

Currently, the farmers are selling a kilogram of sweet orange at the rate of Rs. 40-65 per kg based on quality.

Due to the lockdown and the impact of COVID-19, the price of sweet oranges has dropped this year compared to last year, a kilogram of sweet orange cost Rs. 90.

Govinda Bahadur Rangeli, coordinator, Sweet

Orange Super Zone Operation Coordination Committee, Sindhuli, said that the area of sweet orange cultivation had been expanding year by year with growth in income.

He said that sweet orange farmers' identity cards have been distributed to around 2,100 farmers in the Sweet Orange Super Zone area so far.

Rangeli added that pesticide was applied from Baishak to Shrawan in partnership with farm owners after the trees started bearing flowers.

Yield loss minimised to four-five per cent

As a pilot programme, AWCP of the pest was conducted in 40 hectares of sweet orange orchards at Golanjor, Rural Municipality-4, Tinkanya in Sindhuli to minimise the damages caused by CCF.

The result revealed that the leaf underside spot treatment with the protein bait was highly effective to minimise the sweet orange losses in the district from 56 per cent to 10 per cent in two years, said Debraj Adhikari,

chief of Super Zone Office and Senior Plant Protection Officer of the Ministry of Agriculture and Livestock Development.

But, the production loss in the Super Zone implementation area in the district dropped to four-five per cent, he said. Sweet orange farming covers around 1,000 hectares in super zone area.

The production loss of sweet orange in the district was above 60 per cent until fiscal year 2017/18 which came down to 10 per cent this year, he said.

He said that they were providing pesticides to the farmers in 50 per cent subsidy under the Super Zone programme.

However, a few farmers still hesitate to use pesticides, he said.

Around 3,000 farmers are cultivating sweet orange commercially in the district.

The production of sweet oranges increased to 9,500 tonnes worth Rs. 350 million in the district this year. Sweet orange trees cover 1,390 hectares of land, but only 735 hectares are productive in the district.

Serving global partners from 9 countries – Nepal, Pakistan, Ghana, Suriname, Bangladesh, Egypt, Indonesia, Thailand, Colombia

Helped citrus growers win their battle against fruit flies in China

Improved farm income of Sweet Orange growers in Nepal

Ecoman Biotech

1500+ automated pest monitoring stations installed in China

10+ years in comprehensive monitoring and reporting system for pests

8 new invention patents, 12 software copyrights, 30 utility model patents & 60+ products

Sindhuli farmers expecting bumper sweet orange harvest

The citrus fruit is cultivated on 1,345 hectares in the district; last year, output amounted to 8,881 tonnes.



The Rising Nepal

FRUIT FLY CONTROL PRODUCT

Great® Fruit Fly Bait (GFFB)



- Environmentally friendly
- Leaves no residue
- No harm to pollinators
- Strong rain water resistance

Spot spraying reduces labour cost
Affordable & highly effective
Improves productivity & quality of
produce



Effective on multiple fly species:

- *B.minax* (Chinese citrus fly)
- *B.dorsalis* (Oriental fruit fly)
- *B. cucurbitae* (Melon fly)
- *B. zonata* (Peach fruit fly)
- *B. correcta* (Guava fruit fly)
- *Z. tau* (B.tau)
- *C. capitata* (Med fly)
- *C. cosyra* (Mango fruit fly)

Attracts both male & female flies
Reduces fruit damage rate down to 1–3%

Area Wide Control Program, 2019 Nepal

Sweet Orange Orchards — *Bactrocera minax*

Fruit damage rate reduced after GFFB application

junar farming in sindhuli

Technicians bringing citrus fly infestation under control

MADHUSUDHAN GURAGIN
BANEPA, July 11

Green pest management treatment method introduced from China has been found effective in controlling Chinese citrus flies that have been destroying Junar -- a variety of sweet orange -- in Sindhuli among other parts of the country.

The method was introduced in Nepal by Dev Raj Adhikari of the Sweet Orange Super-zone Unit under the Prime Minister Agriculture Modernization Project and Karma Group -- an importer of fertilizers. The method was developed by Beijing Ecoman Biotech Company Limited.

"Farmers have been spraying Great Fruit Fly Bait (GFFB) on the underside of the leaves. As female citrus flies need protein to lay eggs, the GFFB pesticide mixed with protein kills citrus flies. This method has worked wonders for Junar farmers of Sindhuli," Adhikari, who is also a senior crop protection officer, told Republica.

Technicians have divided 300 ropani of land (5,476 sq ft) Golanjor Rural Municipality Sindhuli, where Junar is cultivated into 10 clusters and sprayed Great Fruit Fly Bait on the



underside of Junar leaves every week for the past nine weeks. "We will wrap up the treatment pro-

cess with the final spray by mid-July," Lalan Kumar Singh, chief of the super zone unit, said.

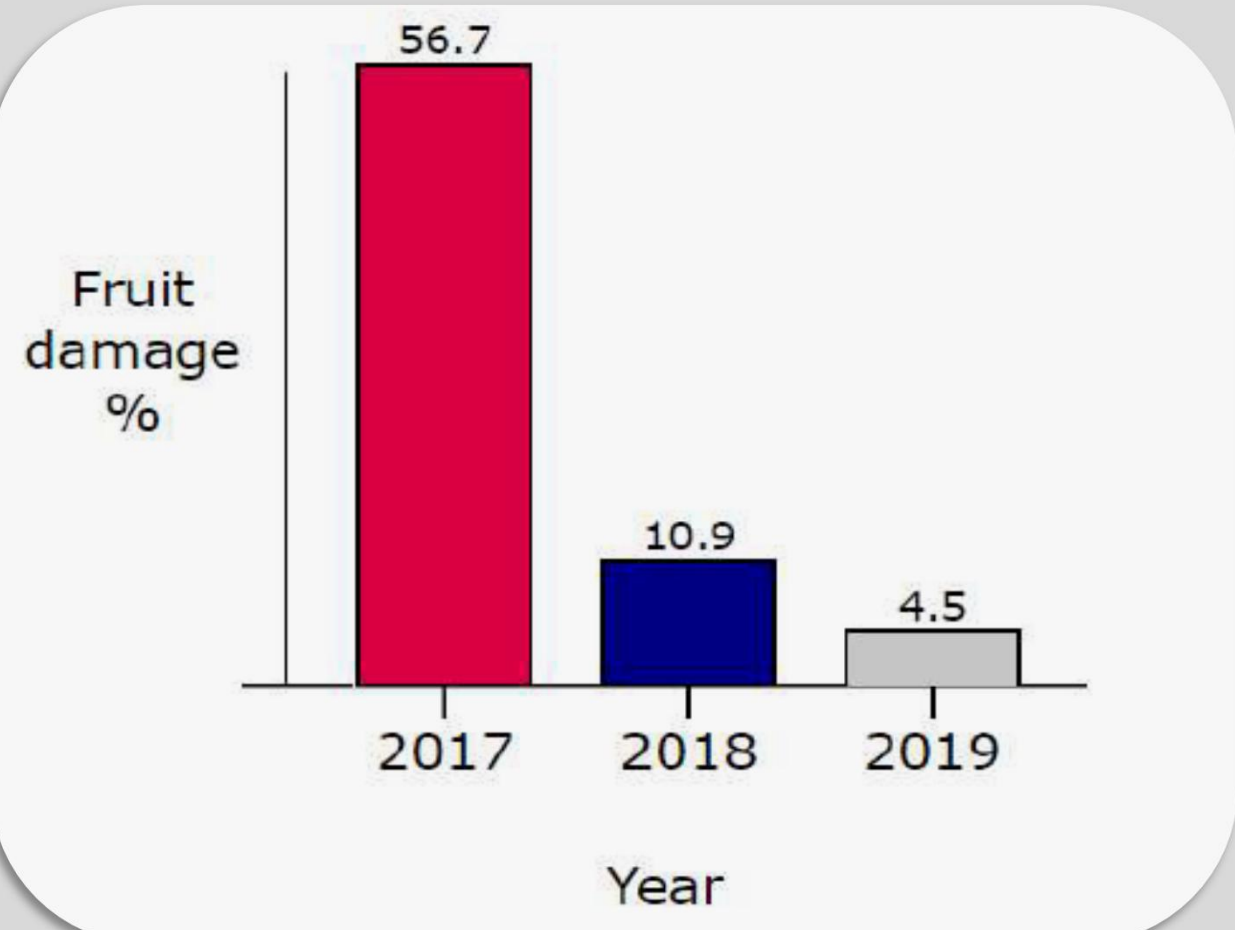
A solution of one-third of GFFB and two-thirds of water has to be prepared, the technicians

added. A solution of 50 ml will be required to spray one square meter of area, according to Lok Bahadur Ale, deputy coordinator of the super zone management unit. "We are employing 10 workers to spray the solution on Junar leaves," he added.

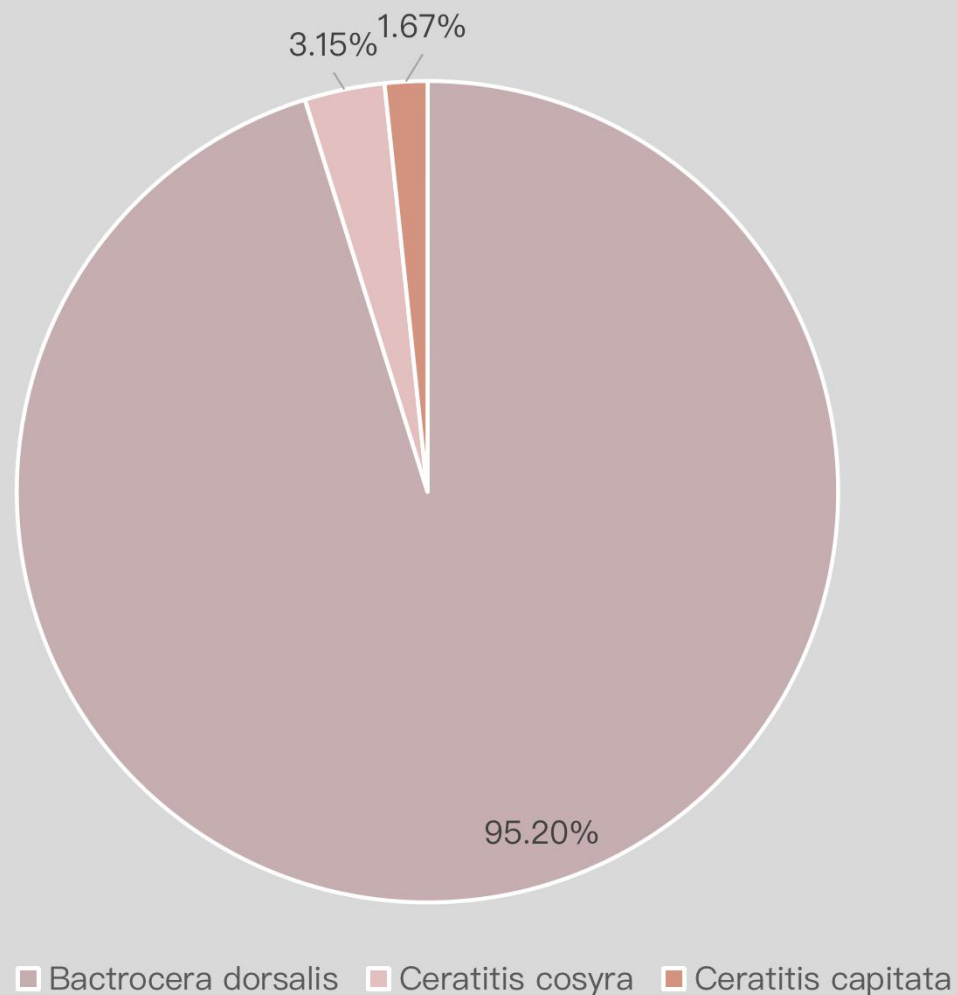
Ale, who was disappointed with low yields last year, is upbeat about better harvest prospects this season. "We have seen the citrus flies dying. As the super zone has introduced treatment methodology at the right time, we are expecting better yields this year," stated Ale.

Suresh Gurung, CEO of Karma Group which introduced the treatment method, told Republica that the pesticide could be imported to Nepal only after representatives of Ecoman were convinced by Adhikari. "The success of this method in Nepal has also elated officials of the company. They are visiting Sindhuli very soon to interact with farmers," he added.

The Chinese citrus flies, which are native of China, made its way to eastern hills of Nepal via Bhutan and Sikkim of India. It invaded Junar farm of Sindhuli last year causing huge loss to farmers. It has since spread across Kailash Sindhupalchowk districts.

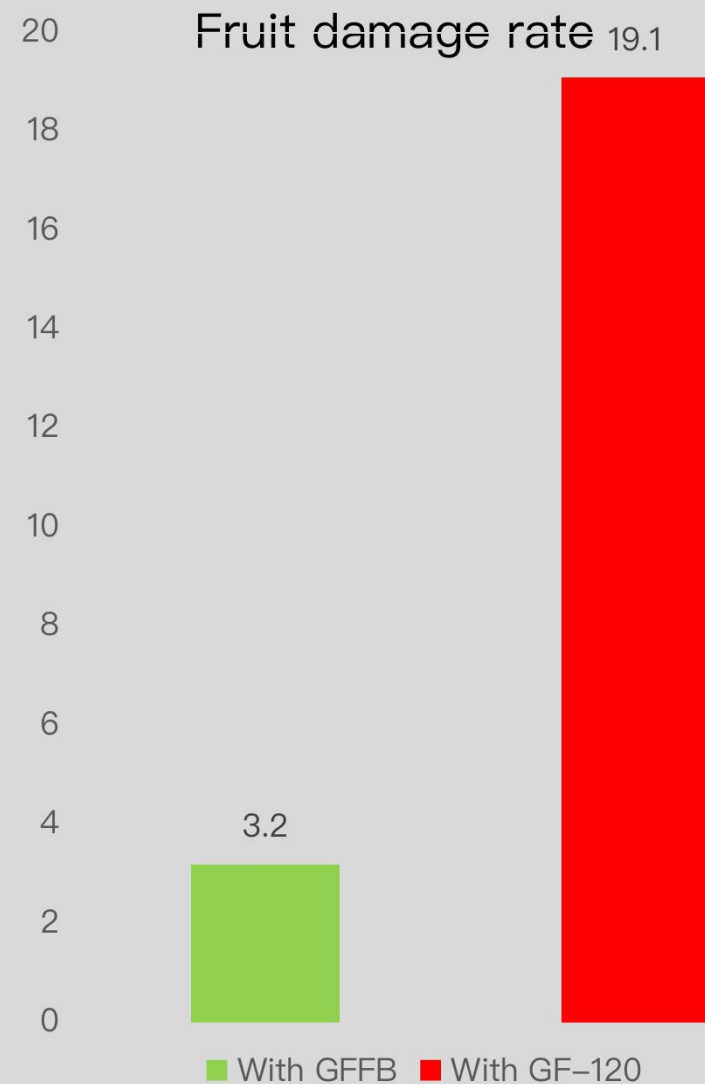


Area Wide Control Program, 2014 Ghana



Fly population trapped at trial site

Mango Orchards — *Bactrocera dorsalis*



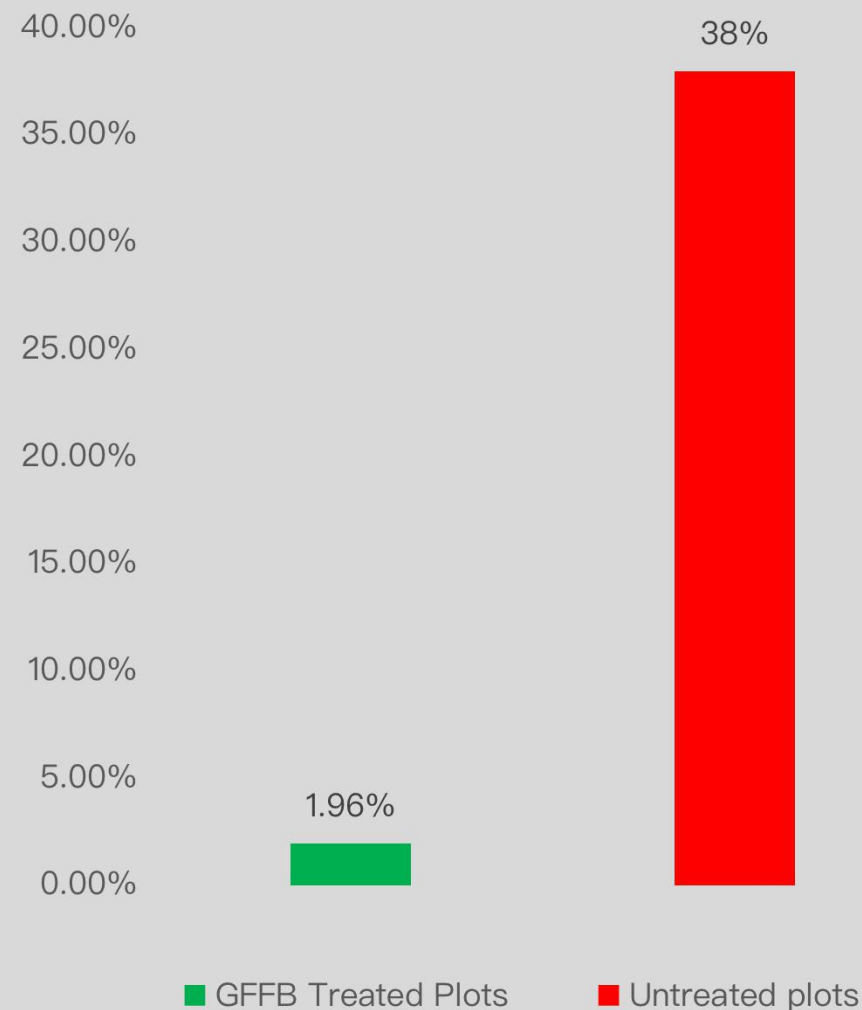
Area Wide Control Program, 2015 Thailand

Mango, Rose apple, Guava, Longan, Mangosteen, Lime,
Grapes —

Bactrocera dorsalis
Fruit Damage Rate



Trial Site — 136 acres

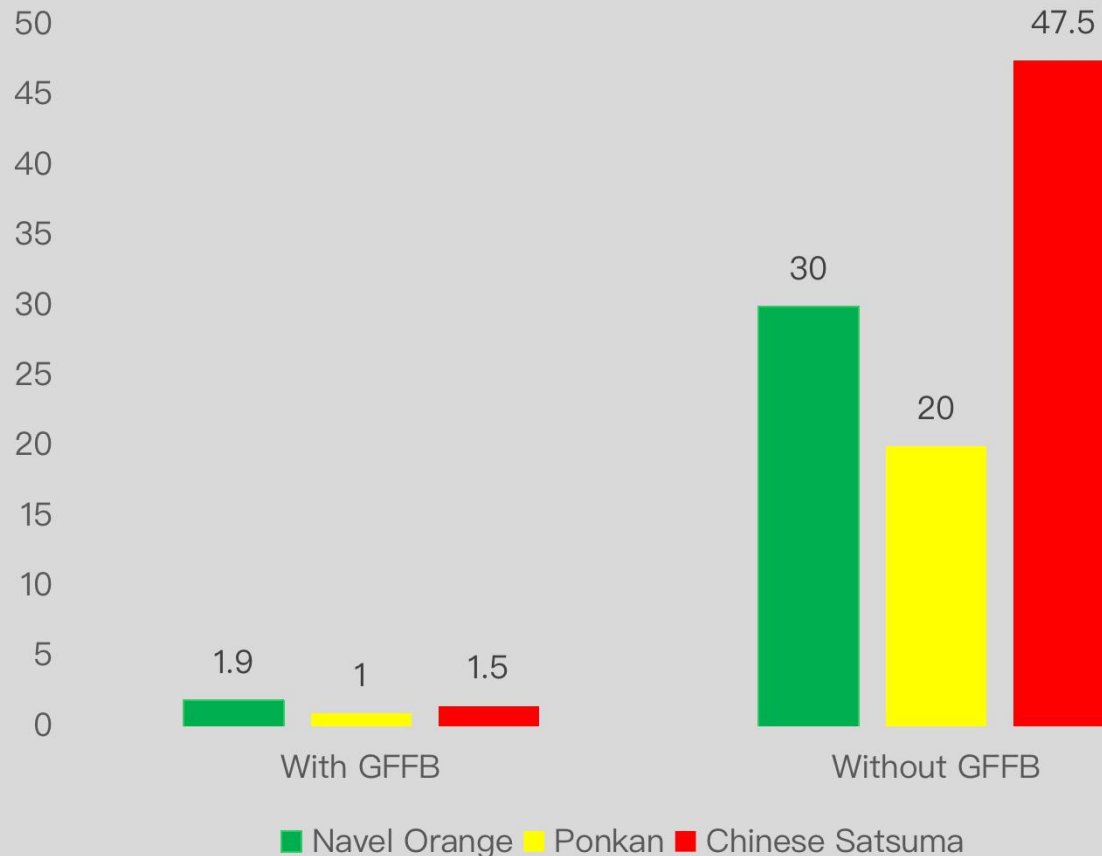


Area Wide Control Program, 2011 & 2012 China

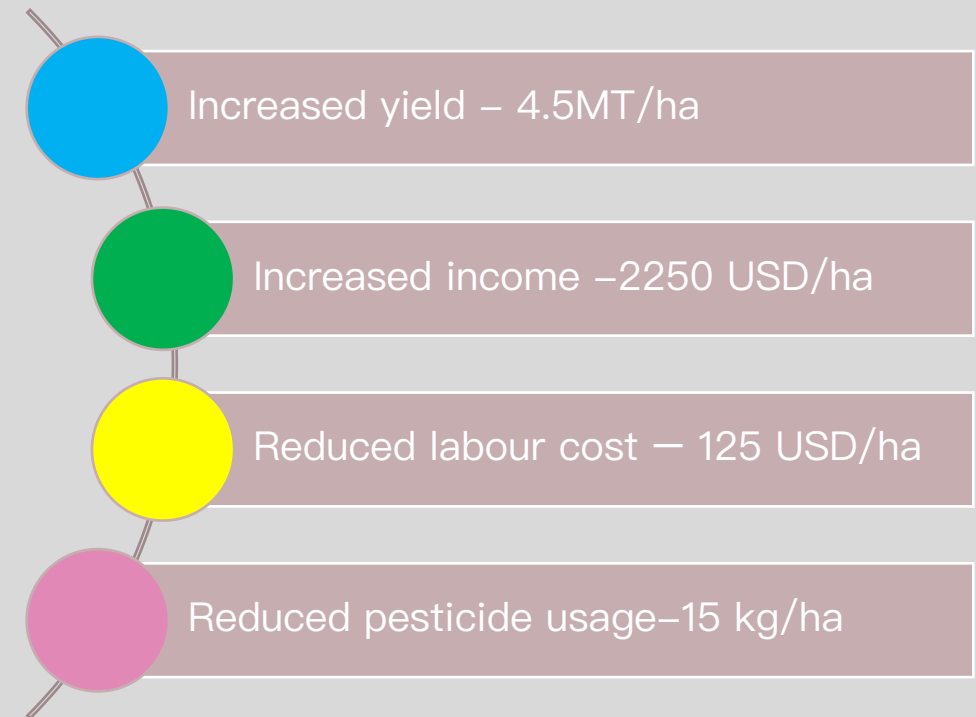
Navel Orange, Ponkan, Chinese
Satsuma —

Bactrocera minax

Fruit Damage Rate



Hunan, 2011



Benefit Analysis in 1 ha citrus orchard
Hubei, 2012

Smart Pest Monitoring Products



TELEMO — Pest Monitoring

Rodent Monitoring

Locust Monitoring

Phototaxis Pest Monitoring

Microclimate Monitoring

UAV Remote sensing & analysis

High-altitude Migratory pest monitoring

Intelligent Monitoring
System

TELEMO® – Automated Pest Monitoring Device

TELEMO® has been promoted and applied in many provinces including Beijing, Tianjin, Shanghai, Hubei, Shandong, Yunnan, Chongqing, Shaanxi, Inner Mongolia.

The system has become the standard configuration of forestry pests and diseases monitoring of the IoT. It is widely used in the monitoring of forestry pests and the prediction of occurrence trends, which has comprehensively improved the level of monitoring and early warning of major pests and diseases in China.

Features:

- Accurate (>95%) & automated data recording

- HD images of the target pests

- Customizable settings for data generation

- Comprehensive data analysis

- Also collects environmental data

- Modular design for easy installation and repairability



TELEMO® – Application



Tobacco Cutworm (*S.litura*)



Oriental Fruit Fly (*B.dorsalis*)



Melon Fly (*B.cucurbitae*)



Northern Armyworm (*M.separata*)
in Wheat



Oriental Fruit Moth (*G.molesta*)
in Pear



Codling Moth (*C.pomonella*)
in Apple



Fall Armyworm (*S. frugiperda*)
in Maize

Smart Rodent Monitoring System

It is based on IoT technology, integrating machine vision, pattern recognition and big data technology. Helps in 24*7 dynamic monitoring, intelligent identification and data analysis. Through effective accumulation of long term monitoring data of target animal population, the system makes accurate prediction and warning of the rodent population outbreak.



Rodent Monitoring Device



Motion capture technology clip

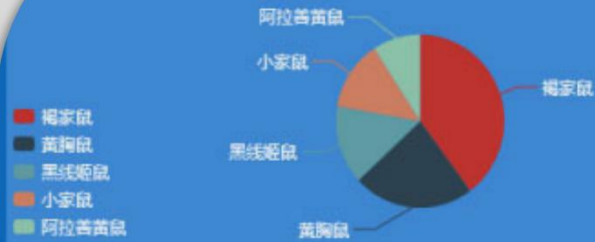


Smart Rodent Monitoring System — Application & Image analysis

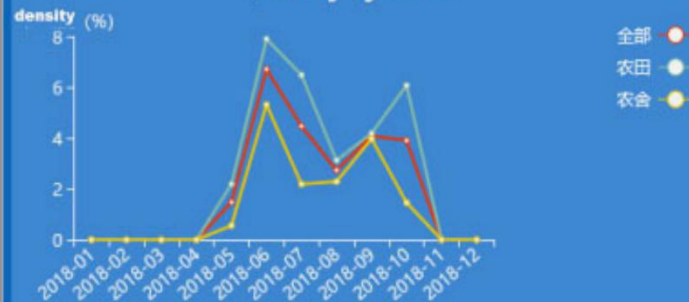


Smart Rodent Monitoring System — Data analysis

Community structure



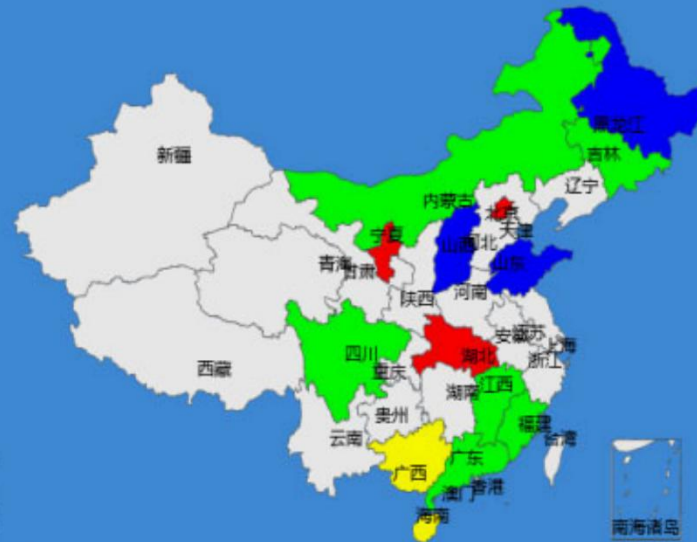
Quantity dynamics



Heat map



Rodent situation in agriculture areas in 2018



Video data



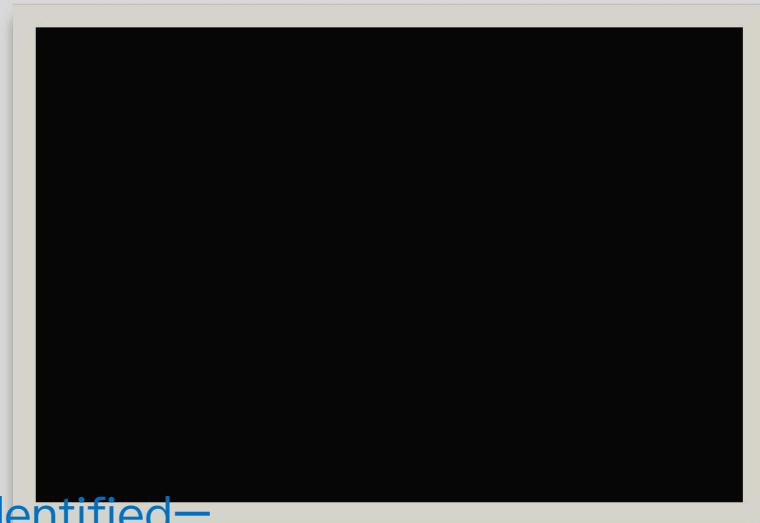
Equipment information

设备名称	生境	信号强度	电池电量	详细地址	更新时间
中科院亚热带所01	农田	20	5	芙蓉区	2018-07-23 16:29
北林区植保01	农舍	18	64.8	兴和乡中兴村	2018-10-30 14:07
北林区植保02	农舍	17	54.4	兴和乡中兴村	2018-10-30 12:37
北林区植保03	农舍	21	63.8	兴和乡中兴村	2018-10-30 14:22
北林区植保04	农舍	16	53.2	兴和乡中兴村	2018-10-30 14:08
北林区植保05	农田	22	71.8	兴和乡中兴村	2018-10-30 14:23
北林区植保06	农田	18	67.3	兴和乡中兴村	2018-10-30 14:13
顺义区植保01	农田	17	100	顺义区龙湾屯镇一果园	2018-10-30 14:14
顺义区植保02	农田	13	5	顺义李遂镇一蔬菜基地	2018-10-18 21:04
顺义区植保03	农田	22	88	北京市新旺镇新旺	2018-10-30 14:13

Monitoring distribution



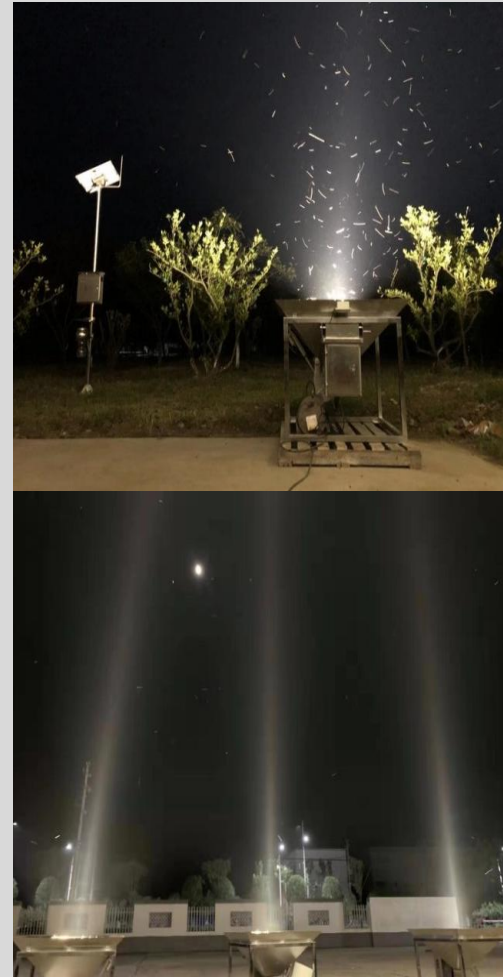
Locust Monitoring Device and Data Analysis System



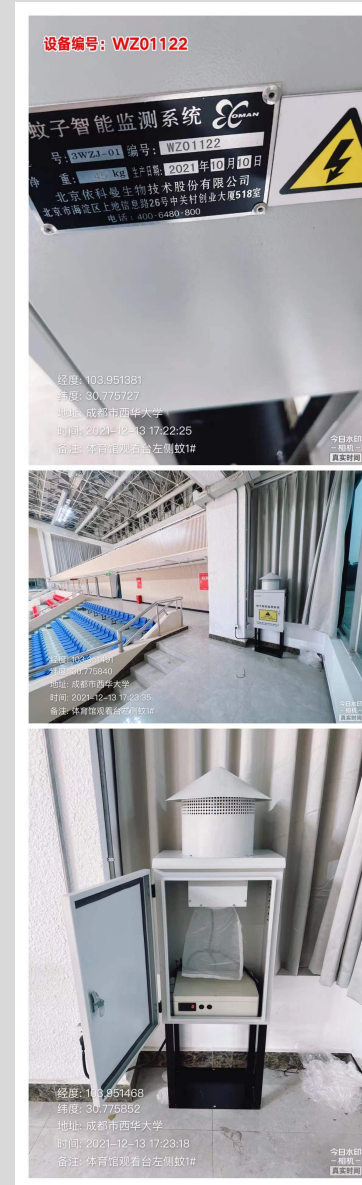
Locust Monitoring Project, Ministry of Agriculture —Two locust species identified—
Schistocerca gregaria & *Locusta migratoria manilensis*.

High altitude monitoring device for migratory pests

The Ministry of Agriculture
blocked *S. frugiperda* at 3
regions & 3 zones.



Smart Mosquito Monitoring System



LURES & TRAPS

Other lures
Thrips
Whiteflies
Locust

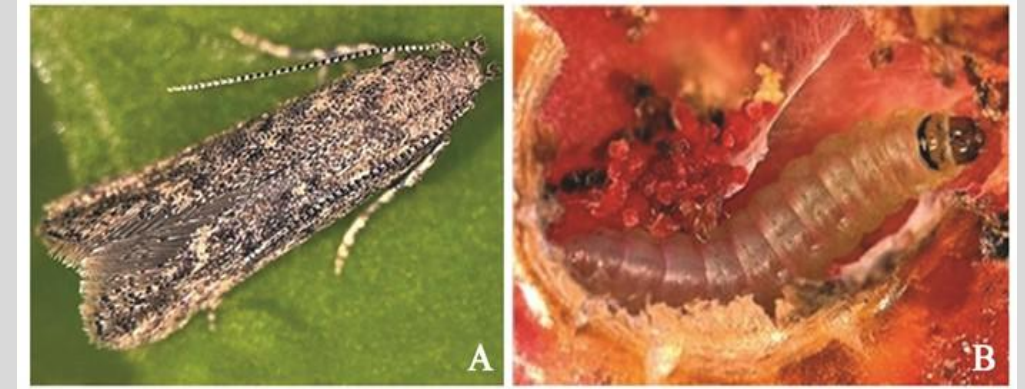
Traps
Fruit fly trap
Mini Trap for fruit fly
Bucket trap
Sticky trap (blue, yellow)
Delta trap
General moth trap
Borer Moth trap

Common Name	Scientific Name
Methyl Eugenol	Fruit Flies — <i>Bactrocera</i> sp.
Cue lure	<i>Bactrocera cucurbitae</i>
Tomato leaf miner	<i>Tuta absoluta</i>
Asiatic rice borer & striped rice stemborer	<i>Chilo suppressalis</i>
European corn borer	<i>Ostrinia nubilalis</i>
Rice leafroller	<i>Cnaphalocrocis medinalis</i>
Yellow stem borer/ Rice yellow stem borer	<i>Tryporyza incertulas</i>
Masson pine caterpillar	<i>Dendrolimus punctatus</i>
Peach fruit moth	<i>Carposina sasakii</i> (<i>C.niponensis</i>)
Oriental fruit moth	<i>Grapholita molesta</i>
Citrus leaf miner	<i>Phyllocnistis citrella</i>
Beet armyworm	<i>Spodoptera exigua</i>
Fall webworm	<i>Hyphantria cunea</i>
Fall armyworm	<i>Spodoptera frugiperda</i>
Northern armyworm	<i>Mythimna separata</i>
Codling moth	<i>Cydia pomonella</i>
Diamondback moth	<i>Plutella xylostella</i>
Tobacco cutworm/Cotton leafworm	<i>Spodoptera litura</i>
Pea leaf miner (Plant-based lure)	<i>Liriomyza huidobrensis</i>
Smaller green leafhopper (Plant-based lure)	<i>Empoasca pirusuga</i>
Plum fruit moth	<i>Grapholita funebrana</i>
Citrus blossom moth/Citrus young fruit borer	<i>Prays citri</i>
Leopard moth/Wood leopard moth	<i>Zeuzera pyrina</i>
False codling moth	<i>Thaumatotibia leucotreta</i>

Tuta absoluta (Tomato leaf miner) lure trial in Nepal:

Treatment – Nala Area, Nepal	21/11/21	24/11/21	27/11/21	30/11/21
Ecoman Tuta Lure	306	163	97	122
Competitor Tuta Lure	203	133	87	87

Treatment – Ramkot Area, Nepal	19/11/21	22/11/21	25/11/21	28/11/21
Ecoman Tuta Lure	534	372	344	287
Competitor Tuta Lure	254	102	58	70
Control	1	4	0	0



Ecoman Tuta lure performed better than the competitor lure

Spodoptera frugiperda (Fall Armyworm) lure trial:

Trapped pest count within 48 hours of <i>Spodoptera frugiperda</i> lure monitoring						
Item	Treatment	25 Aug.	10 Sep.	20 Sep.	30 Sep.	9 Oct.
Ecoman Trap & Lure	1	674	400	1100	490	210
	2	432	612	820	270	70
	3	512	910	1315	570	170
	4	453	1200	920	550	730
	5	389	430	200	220	230
	6	337	300	230	86	2
Blank control	7	4	0	0	0	0
	8	0	2	3	0	0
Other products in the market	9	180	205	250	270	190
	10	142	240	150	68	35
	11	127	250	220	119	25
	12	231	450	350	175	56
	13	428	380	650	425	87
	14	392	520	450	250	100



Cooperation method:

- Govt. funded projects for fruit fly control schemes in Africa or other developing nations.

Ecoman is willing to support efficacy trials for fruit fly control through large scale area wide programs. Demonstrated efficacy will provide basis for establishment of model program for fruit fly control to be replicated throughout the country. It will be useful for big growers as well as marginal farmers, who can benefit from improved farm efficiency and productivity catering to both domestic and export markets. We strongly believe it will provide a perfect solution to fruit fly problems in developing nations.

- Exclusive distribution arrangement with a dedicated local partner.
- Provide document support for Product Registration.
- Remote training & technical assistance.
- High quality products at competitive prices.



Thank you!!

For more information please contact:

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