第六届亚洲有机稻农大会

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中国有机稻田有害生物的生态防控和多样性保护

Biodiversity Conservation and Ecological Control Measures of Rice Pests in Organic Rice Paddy in China

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1. 前言

Foreword

The issues of food safety and environmental protection are critical to the survival and development of human beings. After the World Conference on Environment and Development, these two issues have become the focus of attention of scientists and governments around the world. Since entering the new century, it has been a big concern to the Chinese government and the people.

Synthetic chemicals used in food production and processing threat food safety and environmental safety.

Seen as an important solution, organic agriculture has shown great promise.

In China, organic rice acreage is 276,000 Ha., production 1.633 million tons, 36% of total organic acreage (2016).

Pests damage organic rice more than conventional rice.

2.有害生物生态控制系统

Ecological Pest Control System

Eco pest control system comprises natural and artificial control sub-systems. Natural control is based on bio-diversity restoration; artificial control uses non-chemical control measures based on pest population control principles. The two systems combined will control pest population, protect crops, protect the environment and avoid food contamination.

自然控制系统结构

Structure of natural control system

① 气象因素/Climate factor

(Temp., humidity, light, wind, rain)

② 天敌因素/Natural enemy factor

a、Parasitic natural enemies

b、Predatory natural enemies

c、Pathogen

③ 食料因素/Food factor

(Variety, population, time of reproduction)

South China: 22 spiders, 18 predatory insects, 27 parasitic insects, rice varieties with different pest-resistance, low temp. in winter and spring, typhoons and storms in summer and autumn.

3.生态控制措施

Ecological Control Measures

3.1 选择和保护生物多样性丰富的种植基地
Choosing and protecting bio-diverse planting base.
3.2 农业防治措施
Agricultural control measures
3. 3 物理防治措施
Physical control measures
3.4 生物防治措施
Biological control measures
3.5 喷施生物制剂
Spraying biological agents

3.1 选择和保护生物多样性丰富的种植基地
Choosing and protecting biodiversity-rich planting base

Rice fields, without pesticides, have a strong base of natural enemies.

Among **arthropods** in Eupatorium catarium，spiders are the No. 1 group, followed by Coleoptera, Hymenoptera, Lepidoptera, Hemiptera; other species exist in small quantities; in terms of both quantity and variety, biodiversity with Eupatorium catarium is greater than common crabgrass or goose grass.

In terms of quantity, spiders dominate in Eupatorium catarium, common crabgrass, and goose grass, spiders account for 57.3% of all insect population in Eupatorium catarium, 32.16% in common crabgrass, and 23.2% in goose grass.

3.2 农业防治措施
Agricultural control measures

1.选用优质、抗虫品种/Choosing resistant varieties

Quality, high-yield, disease resistant variety certified or proven to be successful; rotate to maintain resistance.

2 .合理密植/Reasonable planting density

18-20k holes/mu (1/15 Ha.)

3 .合理轮作/Reasonable rotation

Rotate, reduce harmful organisms. Rice/vegetable rotation, rapeseed in winter, water/dry rotation

4 . 灌深水灭蛹/Irrigation to eliminate pupae

During the peak season of peak period of stem borers, plow and irrigate to 5-10 cm. Most mature and 老熟幼虫和蛹 can be terminated in 3-5 days.

3.3 物理防治措施
Physical control measures

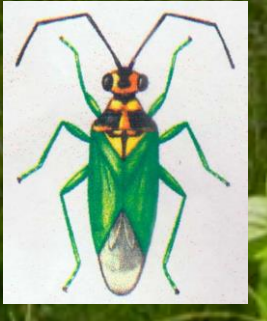
Light traps in the fields can kill adults pests, reduce number of eggs laid, reduce population.

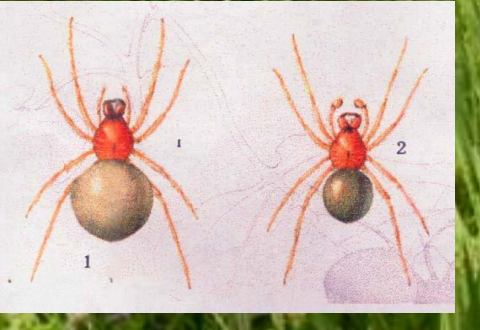
1 light/2-3 ha. , arranged in cross-patterns, at 1.5 m above ground, 150～200 m between 2 lights, on from dusk to 1am, clean regularly.

3.4 生物防治措施
Biological control measures

1. **Protect and use natural enemies**

In early stages, set **loose standards**. Use **predatory** and **parasitic** natural enemies like frogs, spiders, to control pests.





2. Planting beneficial weeds such as *Eupatorium catarium* on the edge of the field to provide habitat for the natural enemies

3. Rice-duck integrated farming

After planting seedlings, release ducks into paddies. 7-15 ducks per mu, until heading. This can effectively control plant hoppers, pomacea canaliculata (golden apple snail), etc.

4 Releasing trichogrammatid wasps

Early during the peak season of stem borer oviposition, release trichogrammatid wasps, 10000-15000/mu.

5. Sex attractant

Chilo suppressalis: as adults appear**,** 1 Chilo suppressalis trap/mu，3 baits in each trap, replaced each generation; traps set 25m apart, 30-50cm above ground during tillering, 10cm taller than plant during heading; laid in grids denser at the center of fields.

Cnaphalocrocis medialis: early adult stage, 2 new moth traps/mu, 18m apart; baits 10-20cm from top of plant, replaced every 30 days.

3.5 喷施生物制剂
Spraying biological agents

USE BIO AGENTS, E.G. BACILLUS SUBTILIS, AGRICULTURAL STREPTOMYCIN, TO PREVENT FUNGAL BLAST AND SHEATH BLIGHT, ETC.; SPRAY AZADIRACHTIN, PYRETHRIN,TO PREVENT RICE PLANTHOPPER, STEM BORERS AND CNAPHALOCROCIS MEDIALIS.

4.小结

Conclusion

Chinese practices of pest control in organic rice farming is based on biodiversity restoration and uses natural and artificial control.

Non-chemical measures are mixed to build an artificial eco control system to work in tandem with natural control system— effectively controlling pest population, protecting biodiversity and healthy growth of rice.

Thanks