Q & A about *the Recent Bamboo Locust Plague*

Recently a bamboo locust (*Ceracris kiangsu*) plague occured in our province. In order help relevant personnel and the public understand this pest and effective control measures, the Yunnan Forestry and Grassland Pest Control and Quarantine Bureau and the Yunnan Academy of Forestry and Grassland (YAFG) asked experts to compile a number of questions and answers, which will be expanded upon as new insights emerge.

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Ceracris kiangsu is widely distributed in the southern provinces of China and neighboring economies. This bamboo locust mainly feeds on bamboo leaves and sometimes on Chinese banana or tiger grass. Corn and rice can become the victim of this insect pest when other food sources are lacking. Bamboo locusts can eat up all bamboo leaves when the population reaches a certain density. It is one of the main pests in bamboo forests.

This year the locust plague broke out along the Pu'er border area. The

hospitable Yunnan people are very puzzled. What kind of guests are they? What are they doing here? How should we treat them?

The famous Chinese general Sun Tzu once said: “Know your enemy and know yourself, and you will never be defeated in battles.” Thus, for this pest, the reader shall be sufficiently prepared for battle.

1. What is bamboo locust?

Ceracris kiangsu Tsai belongs to the genus *Ceracris* (Family Arcypteridae; Order: Orthoptera), and is commonly known as the bamboo locust, a type of locust occurring in China. An alternate Latin name is *Rammeacris kiangsu* Tsai.

More simply put, *Ceracris kiangsu* is a kind of insect similar to the grasshopper. It is a relative of many grasshoppers. Common grasshoppers eat tend to specialize weeds and do less harm to trees and crops, so we think they are somewhat harmless.

This time the *Ceracris kiangsu* population has, however, reproduced at unpreceded levels, severely harming bamboo forests and even crops. Thus, effective control measures have to be devised.

Fig.1 *Ceracris kiangsu* comes in groups (Photo by Chen Peng)

2. What does the bamboo locust look like?

(1) Adult Detailed Physical Description

The length of male is 27.5-36.2mm, the female is 29.8-41.4 mm. The body color is mainly green and yellow. Its forehead bulges and the face and forehead form a triangle. There is a yellow longitudinal line from the forehead top to the center of the pronotum, which widens towards the back. The filariform, the dark brown antenna has 26 segments, and the 2 top segments are pale yellow. Its compound eyes are oval in dark black. The wing length is longer than the belly, of male it's 24.5-25.6 mm, and of the female it's 29.5-34.5 mm. The protoloma and the middle parts of the front wing are dark brown, and the gluteal region is green. The hind femora is yellowish green with two blue and black rings near the tibia, and the middle part has a neat "herringbone" brown groove; the tibia is blue and black with two rows of spines, 15 in the inner row and 14 in the outer row. The spine base is light yellow, the end is dark black, the abdomen is 11 segments, the back center is light yellow, and the abdomen is yellow.

(2) Adult Key Identifying Characteristics

It is not necessary to measure the body wings to identify the adult of the bamboo locust, but it is necessary to remember the following points: the adult has wings, which it can use to jump and fly around; the antennae is longer than the head, but not as long as its body; when holding the insect

from front to back, its face is triangular, and a **yellow vertical line runs through the head and the back** can be seen (Fig. 2) ; there are 3 pairs of legs, and the hind pair are thick and yellow green; inspected more closely, it can be seen that the middle part of the hind legs is lined up with brown "herringbone" grooves. **The adults can fly** and quickly transfer from one place to another, which is the reason for the rapid expansion of the damaged area.

Fig.2 One evident yellow vertical line runs through the pronotum of *Ceracris kiangsu*, and in the middle of the hind legs, there are "herringbone" brown grooves (Photo: Chen Peng)

Nymph Detailed Physical Description: its body is similar to adults but wingless, and the nymph has a total of 5 instars: the first instar nymph is

9.5-11.0 mm long, light yellow, the top of the head protrudes like a triangle, the tip of the antennae is light yellow, the posterior edge of the pronotum is not protruding backward, and the wing buds are not obvious; the body length of the second instar is 10.8-15.2 mm. Body color is yellow, and the posterior edge of the pronotum is like that of the 1st instar nymph, the front and rear wing buds are protruding backward and are indistinctly visible; the body color of the 3rd to 5th instar is mostly yellow black; the nymph body length of the 3rd instar is 15.0-18.4mm, the posterior edge of the pronotum is extending backward slightly, the forewing bud is long and narrow, and the rear wing bud is triangular and purple and black; the nymph of the 4th-5th instar is emerald green. The nymph of the 4th instar is 20.3-24.5 mm long, wing bud's front edge is slightly yellow, extending to the end of the 2nd abdominal joint, the posterior edge of the pronotum extends significantly backward, covering most of the metathorax, the dorsal midline is yellow, and there is a black longitudinal line under the dorsal midline; the nymph's body length of the 5th instar is 28.5-30.8 mm, the front edge of the wing bud is yellow and extends to the 3rd terminal joint at abdomen.

Nymph Key Identifying Characteristics. When the eggs are hatched, they are nymphs. Generally speaking, nymphs are grasshoppers that have not grown up and matured, yet. Because the wings of the grasshopper are not fully developed, they can only jump and cannot fly (Fig.3). Therefore, the

jumping ones we see are nymphs. The nymphs of *Ceracris kiangsu* can shed its cuticle five times in its life (i.e. 5 instars as experts say). The empty shell of a locust crawling on the branch often seen is the "remains" left by the nymph after shedding. After shedding five times, their wings grow hard and they become adults. The difference between the 1st-2nd instar and 3rd-5th instar of *Ceracris kiangsu* lies in the change of body color: from the 3rd instar, there are obvious longitudinal black bands on both sides of the pronotum, and the longitudinal yellow bands in the middle of the back are more obvious.

Fig.3 Nymphs of *Ceracris kiangsu* (Nymph, body color gradually changing from green to yellow)

(3) Eggs Detailed Physical Description: Long elliptic, slightly pointed at the upper end and slightly curved in the middle. It has a vertical diameter of 6.2-8.5 mm, a horizontal diameter of 1.9 -2.6 mm, and is brownish yellow with honeycomb reticulation. The oocysts are cylindrical in shape, slightly thick at the lower end, with a long diameter of 18-30 mm and a

short diameter of 6 -8 mm, and they are drab.

An easy and effective control measure is to destroy the eggs of *Ceracris kiangsu* Tsai.

3. What is the life cycle of *Ceracris kiangsu*?

Please have a look at the figure below (Fig.4).

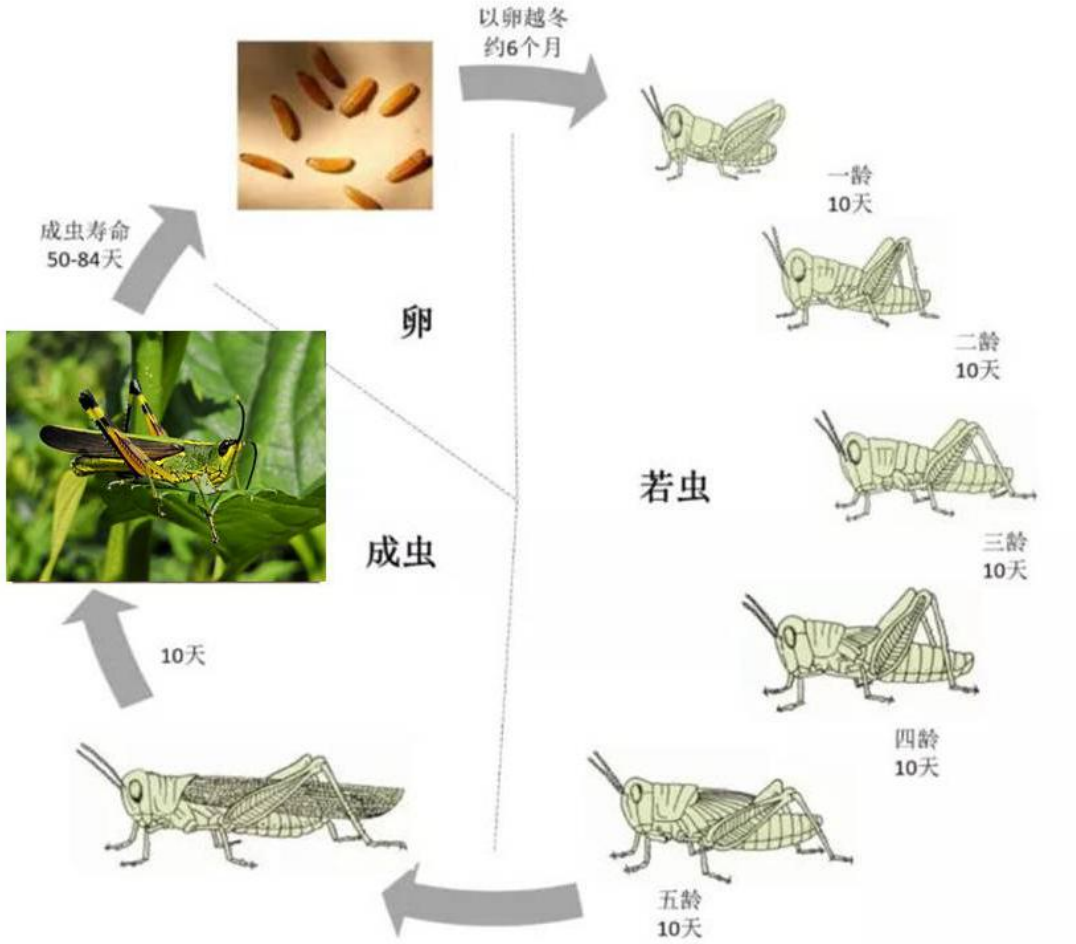

Fig.4 Life History of *Ceracris kiangsu* (adapted from the Kunming Information Port)

Like other locusts, *Ceracris kiangsu* is an incomplete metamorphosis insect, which can be categorized into egg, nymph and adult. It has one generation per year in all provinces (regions) of China. It overwinters for

about six months in the egg sac in a depth of 1-2 cm underneath the soil. Its development period is closely related to the environment and temperature. The incubation period lasts for a long time in the forest. In China, the overwintering eggs begin to hatch from the middle of April to the first ten days of June with a south-north gradient. As mentioned earlier, the nymphs are divided into 5 instars, with an average of 10 days per instar. The average development phase of female and male nymphs is 57.17 and 55.96 days, respectively. The adults begin to form in early July, and emergence peak is 15 days later. Adults can copulate about 10 days after emergence, but they need to feed for 20 days. Eggs are laid from late July to early August.

4. Has the bamboo locust occurred in China before?

In fact, the bamboo locust is a native insect species in China, widely distributed in the Southern provinces of China, mainly South of Qinling-Huaihe River (Qinling-Huaihe is commonly understood as the dividing line between North and South China) and neighboring economies in the GMS region. Jiangsu, Zhejiang, Hunan, Anhui, Sichuan, Chongqing, Guangdong, Guangxi, Yunnan and other places are most severely affected. In Yunnan Province, the *Ceracris kiangsu* was recorded during a pest survey in the 1980s. Therefore, the bamboo locust is not a invasive species.

5. How should *Ceracris kiangsu,* which is rampant in Yunnan, be

approached in the specific Chinese context of upholding ecological security and building an “ecological civilization”?

These swarms of *Ceracris kiangsu* Tsai population come from neighboring economies and mainly destroys Yunnan’s bamboo forests. In 2018, 2019 and 2020, the bamboo locusts have crossed the Lao border to Jiangcheng County of Pu’er City and Mengla County of Xishuangbanna Prefecture in Yunnan Province for three consecutive years, especially in July 2020.

Fig.5 Bamboos destroyed by *Ceracris kiangsu* (Photo: Chen Peng)

This time, however, locust has gone too far, not only causing serious economic losses, but also posing a serious threat to ecological security. Therefore, *Ceracris kiangsu* is considered a malicious “uninvited guest”, and while not an invasive species per se, does pose a threat through **cross-border biological invasion**. General Secretary Xi Jinping given Yunnan long ago the role of becoming the pacesetter of the construction of an ecological civilization. Thus, Yunnan province should maintain the

status of “two kingdoms, one garden” (namely the animal kingdom and the plant kingdom harmoniously united in the “Chinese garden” aka China, an important concept under the ecological civilization umbrella). Through the destruction of forests and farmland the locust is threatening to upset this fine balance. Therefore, the plague has to be controlled.

6. Why is the bamboo locust plague so severe this time?

The global climate is changing, resulting in a rise of temperature in the past year. Most of the overwintering eggs in the soil did not freeze to death, which greatly increases the base number of eggs hatching in the this year. In addition, high temperatures and dry weather often occur in spring, including this one, which provide good environmental conditions for the locust outbreak. This is also the reason for the serious bamboo locust plague in Laos this year. According to the weather analysis, the high temperatures and drought in Laos in spring in 2020 sped up the hatching time of eggs, improved the survival rate of the hatching nymphs, and advanced the migration and spreading time, which all contributed to the early invasion time and large population of *Ceracris kiangsu* in Laos, where it eventually migrated to Yunnan.

7. What are the preferences of *Ceracris kiangsu*?

(1) The main food source is bamboo; the eating habit of the *Ceracris kiangsu* is relatively simple, aside from bamboo it also eats Chinese banana, tiger grass etc., but it can also damage crops, such as rice and

corn when food is scarce. In Xishuangbanna and Pu'er where the bamboo locust plague occurs, it mainly feeds on bamboo, such as *Dendrocalamus giganteus*, *Dendrocalamus membranaceus*, *Dendrocalamus brandisii*, *Dendrocalamus barbatus* and *Dendrocalamus sinicus*. As *Ceracris kiangsu* is native to China and bamboo forests are generally adapted to forage by this insect, it is rather the degree of predation that determines whether ecosystem health and by extension rural livelihoods will be affected. If they are negatively affected, control measures have to be implemented.

(2) Likes urine: It may seem surprising that *Ceracris kiangsu* likes the smell of urine. Ammonia is the reason for the locust's attraction to the substance. According to the research of Chinese scientists, the shedding of the nymph's cuticles consumes nitrogen, which is an element in ammonia. Especially the shedding of the 5th instar locust consumes a large amount of nitrogen, which is the main reason the locust is so attracted to urine. Research shows that fermented human urine can attract both nymphae and adults of *Ceracris kiangsu*. Generally the locust is more likely to be attracted by the human urine that has been fermenting for 30 days. Therefore, using fermented urine for trapping and killing the locust is one of the options to control the plague.

(3) Likes crowding: this occurs in two forms; 1) when the population density is large, swarms of nymphs gather on plants to feed; 2) before

mating, adults often gather together in groups, and migrate from one place to another, so as to expand the throughout the area rapidly; strong wind can increase the migration distance of the locust further, and with the aid of air flow, it can move up to 20 km at one time.

(4) Likes clean environment: Although *Ceracris kiangsu* can lay eggs in the entire bamboo forest, it prefers cleaner places. Chinese scientists have found that in areas where shrubs, weeds, lianas and ground litter are removed and fresh soil is exposed, the amount of eggs laid by adults of *Ceracris kiangsu* Tsai is twice as much as in uncut plots. Thus, refraining removing litter can be beneficial for fighting the locust but may negatively impact accessibility.

8. Can we effectively control the bamboo locust?

The bamboo locust is not a new thing, and it is not difficult to control. Chinese scientists have already previously studied it in detail. As early as 2011, the “Technical Regulation for the Control of *Ceracris kiangsu* Tsai” (GBT 27645-2011) was formulated, and it can be used for guidance. At the same time, populations differ in different places, including between China and abroad. Although the behaviors of these different populations are essentially the same, there are some smaller differences, such as the eggs laying time, the hatching, and when the nymphs shed their cuticles. These differences should also be taken into account when attempting to control the locust.

9. Under what circumstances should *Ceracris kiangsu* be controlled?

In the "Technical Regulation for the Control of *Ceracris kiangsu* Tsai", the degrees of harm caused by the bamboo locust is classified into three levels based on the survey on nymphs in the 4th and 5th instar and adults:

Slight damage: the damage area of bamboo leaves is less than 1/3 (the bamboo forest is slightly discolored from a distance)

Moderate damage: the damage area of bamboo leaves is 1/3-2/3 (the bamboo forest is withered yellow from a distance)

Severe damage: the damage area of bamboo leaves is larger than 2/3 (the bamboo forest seems burned from a distance)

In on-the-ground surveys the damage level of *Ceracris kiangsu* can be classified according to the table below:

Survey stage	**Unit**	**Damage Level**		
		Slight	**Moderate**	**Severe**
Nymphs	Nymphs/m^2	2～5	6～20	more than 21
Nymphs and adults	Nymphs & adults/plant	5～15	16～30	more than 31

The current outbreak in China is considered severe. The locusts consume large amounts of bamboo, spread quickly and cause serious damage. Therefore, they must be prevented and controlled. In a word, the *Ceracris kiangsu* needs to be controlled if it causes economic loss. Nymphs of the 4th -5th instar and adults are the most likely to cause losses, but nymphae

of 1th -3th instar are easier to control because of their relatively weak resistance.

As a matter of fact, to ordinary farmers, if "the bamboo forest is withered yellow from a distance" or "the bamboo forest seems burnt from a distance", other crops will most likely also be damaged. Is it too late to prevent and control the plague at this time? The withered and yellow bamboo forest means the loss cannot be avoided. Therefore, Chinese scientists put forward the principles of prevention and control of the *Ceracris kiangsu*: **prevention first, scientific prevention and control, governance according to law, and promotion of ecosystem health**. We should control the bamboo locust as early as possible (to avoid economic losses before the damage is caused) and control the young ones (firstly because when focusing on control the nymphs, one can take advantage of the lower the resistance of small young ones to insecticides and they are easily killed; secondly when the population density is not large, it is time-saving and labor-saving to control).

10. How can we monitor *Ceracris kiangsu*?

The focus is to carry out surveys on egg stage, nymphs and adults.

The egg laying survey is based on the migration pattern of the bamboo locust, and the best time is after they've laid eggs from September to November every year. Generally, the egg laying time of adults can be estimated according to the degree of damage of the bamboo. If the

bamboo leaves in the lower layer of the bamboo forest in the place where the *Ceracris kiangsu* lay eggs are seriously damaged, it means that more locusts have moved up the upper layer branches, and the overall larger population leads to a larger egg laying (oviposition) density. Additionally, as the females die after egg laying, the amount of dead *Ceracris kiangsu* in the spawning place is an indicator for egg density as well. Most of the eggs of the *Ceracris kiangsu* Tsai are found on sunny hillsides and forest land with moderate soil density. Through careful visual observation and investigation, egg laying range and population density can be determined.

The investigation on the nymph stage and the egg stage begin in mid April. The results show that nymphs of the 1^{st}-2^{nd} instar like to eat short bamboo branches and gramineous plants on the gorund, while those beyond the 3^{rd} instar like to eat on the top tips of bamboo, which obviously damages the top shoots of bamboo. The larger the density of the nymphs, the more serious the damage will be. When the damage is serious, the bamboo forest is yellow or seems burnt, which is obviously different from the green of the surrounding healthy bamboo forest. According to the above symptoms, we investigate the distribution range, area and damage degree of the nymphs, and take effective measures to control it.

The migration of adult *Ceracris kiangsu* is investigated from the early and middle of July to the last ten days of August. In general, the bamboo

locusts do not migrate when they have enough food, only when they are short in food. Therefore, it is necessary to observe the bamboo forest within the range of occurrence area of the plague, and judge the migration of adults from the bamboo forest form. When the bamboo is abnormal and the bamboo leaves decrease sharply, it is basically confirmed that the locust has moved in. Through investigation, patterns of occurrence and development, distribution range, area and damage degree of adult *Ceracris kiangsu* can be accurately estimated.

11. What strategies does Yunnan have in place to fight the bamboo locust?

Based on experts' recommendations, the government has put forward strategies for the prevention and control of the *Ceracris kiangsu*: focus on the "control of immigration and spreading" in the local prevention and control of the locust, closely monitoring the insect and warn early, fully mobilize forest rangers and forest resource officials to participate in the monitoring and early warning work of *Ceracris kiangsu*, and establish a pest monitoring network at the provincial, municipal, county, township, village, group and public welfare forest official levels, so as to comprehensively and accurately assess the occurrence of *Ceracris kiangsu*, comprehensively screen plague hazards, and ultimately win the battle against the pest with firm determination, powerful measures and efficient actions.

Meanwhile relevant information about bamboo locust plagues in neighboring countries linked by mountains and rivers should be collected, and close attention to bamboo locust populations in foreign countries should be paid, so that new waves of "invasion" are prevented.

12. How can we control the bamboo locust?

It should be dealt with it based on the priorly determined classification. According to the results of pest monitoring, *Ceracris kiangsu* is classified and controlled to ensure the safety of forest resources and food production, and early control on nymphs is emphasized.

In areas with severe occurrence, unmanned aerial vehicle (UAV) and ground control, as well as chemical and biological control measures are taken to quickly reduce the pest populations. Based on this, it is followed up with more moderate biological control methods. Biological control is the main method in areas with moderate occurrence. In areas with mild occurrence areas, monitoring should be strengthened, and attention should be paid to quantitative changes of the locust populations at any time. Necessary preventive measures such as physical control, chemical control and biological control should be taken to prevent the spread of the pests.

Fig.6 Pu'er City Municipal Forestry and Grassland Bureau conducts UAV control (Pu'er City Municipal Forestry and Grassland Bureau)

13. What are the specific measures to control *Ceracris kiangsu*?

(1) Artificial Control

Determine the location and scope of egg laying (oviposition) sites and organize manual excavation of the *Ceracris kiangsu* Tsai eggs for destruction, or mark them, and regularly monitor them; before the end of March, combine with bamboo forest tending or dig out eggs for centralized treatment; from the middle of April to the end of June, use chemicals to control the emergence of nymphs. The oviposition area and range can be determined according to the following characteristics:

① Generally where *Epicauta ruficeps* (a type of beetle eating eggs of *Ceracris kiangsu,* Fig. 7) appears bamboo locust eggs are likely to be found; also the leaves of bamboo shoots are generally seriously damaged;

② Eggs may exist in places where on the ground bamboo and weeds are seriously damaged;

③ In the oviposition places, there are often remains of bamboo locust adults, such as the head capsule, the pronotum, wings and hind feet;

④ At the upper end of the egg, there is a black egg cap with a gelatinous sclerosis, which is round and concave.

Fig.7 *Epicauta ruficeps* eating *Ceracris kiangsu* eggs

(2)Liquid Trapping

Attraction and killing is a good method for bamboo locust control. Based on the locust's fondness for urine, a small pit with a diameter of about 20cm can be dug every 5-8m along a plank road or mountain road between the time when the nymphs jump on the bamboo tree and before

the adult lays eggs. They should be padded with plastic film and about 150 ml of urine mixed with dipterex or trichlorphon should be poured into them; or a bamboo trough containing 150ml of the above-mentioned liquid should be placed every 5-8m, and the liquid should be changed every 2-3 days on sunny days. The ratio of urine to insecticide is 20:1, and the ratio of urine to trichlorfon is 100:2.

Fig.8 Bamboo locust control staff from Taojiang County, Hunan province shows the insects trapped in the urine trapping device (Photo: Hunan Channel)

However, it is important to not simply use urine to lure in and kill *Ceracris kiangsu*. In order to trap and kill it with urine, it is necessary to ferment the urine in advance. In fact, anything that can contains ammonium, which produces the smell of urine, can be used to trap and kill the locust, such as ammonium carbonate and ammonium bicarbonate solutions. Some studies have shown that a mixed solution of 2% salt + 10% ammonium bicarbonate + 5‰ indole (a common nitrogenous chemical substance), or 2% salt + 10% ammonium bicarbonate solution, has a great attraction for *Ceracris kiangsu*. It's important to remember when attempting to trap and kill the bamboo locust, insecticides need to

be added (see above). It should be noted that dry ammonium bicarbonate is avoided by the locust, some water should be added.

The people of ancient China had their own ways of dealing with the locust: in the *Book of Songs*, there is a poem, saying “lure insects with bonfire and then kill them”, which shows the people’s hatred for the locust plague. In ancient times, there was a “bonfire trapping method” for locusts: when it was getting dark at dusk, a campfire was lit to attract a large number of locusts, and then people took the opportunity to kill them. However, fire in the field can easily cause forest fires, thus it is no longer recommended as a trapping method.

(3)Fumigation

In woodlands with *Ceracris kiangsu* swarming in large areas, where inconvenient transportation, steep hillsides, high canopy density or sheer distance from civilization makes it difficult to control the insects, a smoke machine can be used. The control time should be in the early morning or evening when there is no wind, so as to fully disperse the smoke in the forest. For example: using the matrine smoke agent, the dosage is 750 ml/hm^2 for control of bamboo locust adults, and the control effect can reach more than 90% after 2 days of fumigation.

Fig.9 Jinghong City carries out a locust plague fumigation drill (Photo: Website of Jinghong Municipal People's Government)

(4)Injection in Bamboo Cavities

This method is suitable for bamboo forests, where pesticides or other control measures cannot be used over large areas, such as scenic spots with frequent human activities. A small hole is drilled with an electric drill from the base of the standing bamboo to the top of the first bamboo node, then 20mm of 18% insecticidal agent is injected into the bamboo cavity along the hole with a syringe, and then the hole is sealed with soil. Because of the transpiration of plants, the chemicals in bamboo cavity will be transported to the bamboo crown through the conducting tissue in the plant, causing the death of any locust eating the bamboo leaves.

Fig.10 *Ceracris kiangsu* Tsai control staff from Hanshou County, Hunan Province injects a chemical agent into the bamboo cavity to control nymphs (Photo: Hunan Channel)

(5)Mist and Powder Spraying

The chemical control method is the best for the newly hatched nymphs at the egg laying site. At this time, spraying powder to control the bamboo locust can get have twice as much of an effect using half the effort, as the nymphs are relatively concentrated in a small area. The specific method is to spray imidacloprid or dimehypo using mist & powder spraying machine on the oviposition site before the nymphs jump on the bamboo. Spraying the insecticide should be carried out in batches. Each egg field

should be sprayed with powder every 4-5 days from the date of hatching, and generally 3 times is enough.

For example, 2% thuricide •fipronil of 6.7 ml/hm^2 has a significant effect on the nymphs, and controls the populations for longer period, and can control more than 96%. It does not harm *Epicauta ruficeps*, the beetle which is an important natural enemy of the *Ceracris kiangsu*. Otherwise use the pesticide diluted with water 1: 4,000 to reach a control effect of 95%.

(6)Biological Control

The natural enemies of *Ceracris kiangsu* are mainly *Telenomus* spp, *Tachina, Epicauta ruficeps*, ants, spiders, mantis, bamboo partridges and so on. They play an important role in controlling the population of locusts. In order to control the pest, alder and Paulownia can be planted on the edge of the forest to attract *Epicauta ruficeps*, and the broad-leaved trees in the Moso bamboo forest can be retained during tending to maintain biodiversity in the forest, and create a suitable environment for the habitat and reproduction of the locust's natural enemies, so as to control its spread.

Both *Beauveria bassiana* and *Metarhizium anisopliae* (microbial insecticides) have the advantage of easy use, being safe for humans and livestock, and causing no environmental pollution when used to control the bamboo locust. From April to May every year, during the initial

incubation period, *Beauveria bassiana* powder is used to control the pest. In general, the dosage is 30-60 kg/hm^2 in a mildly affected area, and 75-150 kg/hm^2 in moderate areas. When the *Beauveria bassiana* powder is applied, the temperature should be 20 ℃ ～ 25 ℃ , and the relative humidity should be 80%～90% or higher. The effect is better if the power is applied after rain.

14. Can the *Ceracris kiangsu* Tsai be eradicated?

We also have *Ceracris kiangsu* Tsai native populations. Most years, the number of bamboo locusts in Yunnan is not large, and they eat little food, so the damage is very little. It is a naturally occurring species. All kinds of species are important for ecosystem functioning, including insects. *Ceracris kiangsu* is part of these ecosystems and and be tolerated by humans if the damage to bamboo and crops is moderate. After all, humans have enjoyed so many resources, and other creatures have rights to natural resources as well. This is an important part of maintaining biodiversity and ecological balance, which is still very important for the ecological security of China. As common people say, you have, I have, and everyone has; you eat, I eat, and everyone eats.

15. What can we do?

At present, the People's Government of China is organizing human and material resources to carry out the prevention and control of the bamboo locust in a bid to resolutely fight and win against the current *Ceracris*

kiangsu outbreak. This, however, requires the cooperation of local people and support of the government's prevention and control work. Local people can **discover and report local outbreaks**, so that the government can organize the prevention and control in time; **guard the homeland, and support prevention and control measures.**

For any questions about any of the policies mentioned, please contact local forestry stations or relevant Forestry and Grassland Bureaus;

For technical questions, please contact the Yunnan Academy of Forestry and Grassland.

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