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Exploration of Efficient Breeding Techniques for South China Chinese Bees in Mengshan County

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Abstract

In recent years, bee products such as honey have emerged in the market, and the number of beekeepers has gradually increased. However, due to the blind following of some personnel and the lack of efficient breeding management techniques, there have been many losses in beekeeping. This article first analyzes the current situation of Chinese bee breeding policies, breeding technology status, and degradation of excellent bee species. Through reasonable selection of beehive sites, scientific and healthy breeding of excellent bee species, and timely honey collection, the key points of efficient breeding technology are elaborated, with a focus on improving the high-yield measures of strong bee populations in South China. The aim is to further improve the economic and social benefits of the beekeeping industry in Mengshan County through scientific breeding and innovative management measures.

Keywords: *South China wasp; Strong group; High yield; Technical points; Mengshan County*

1. Introduction

As the most abundant characteristic and excellent bee species in Mengshan County, the South China Bee in Mengshan County produces high-quality duck foot wood honey, which is highly favored by consumers. There are phenomena such as excessive manual intervention or blind introduction in the breeding process of South China Bee in Mengshan County, which to some extent restricts the sustainable and healthy development of the South China Bee breeding industry in Mengshan County. Mengshan Chinese honeybees have various advantages such as resistance to mites, heat, cold, and strong adaptability. At the same time, they also have disadvantages such as a love for bees, poor disease resistance, and difficulty in maintaining large populations.

Therefore, in the breeding process, beekeepers should fully utilize the advantages of bees, continuously explore supporting technologies and management methods for high yield of Chinese honeybees, fundamentally control the pest and disease hazards of bee populations, and promote the rapid reproduction and production of Chinese honeybees to achieve good benefits.

2. Analysis of the Production Status of South China Chinese Bees in Mengshan County

2.1 Policy Support

China is one of the world's largest honey exporting countries, and the country has introduced many preferential policies and guarantees for the beekeeping industry in South China, such as the "Twelfth Five Year Plan" for the National Beekeeping Industry Development, the "Notice on Promoting the Mechanization of Beekeeping Industry", the "Notice on Implementing the Action to Improve the Quality of Beekeeping Industry", and the "14th Five Year Plan" for International Cooperation in Agriculture and Rural Areas. At the same time, in terms of city and county policies, the 2019 Mengshan County Bee High Quality and Efficient Breeding Technology Demonstration and Promotion Project, the 2019 Mengshan County Honey Source Plant Planting Project, the 2022 Wuzhou City Beekeeping Industry Quality Improvement Action Project, and the 2022 Mengshan County Rural Comprehensive Reform Pilot Agricultural Industrialization Joint Demonstration Project (Beekeeping Development Project) have been implemented. The implementation of the above policies not only

provides great policy support to beekeepers in purchasing beekeeping equipment and improving the quality of beekeeping products, but also, Mengshan County has promoted efficient bee breeding technology and models, supported demonstration bee farm construction projects, and achieved a significant increase in beekeeping volume. The implementation of the Bee Industry Quality Improvement Action Project has promoted efficient bee breeding technology and models, and a total of 30 demonstration bee farms have been established. The artificial cultivation technology of honey and pollen source plants has been applied, and a local honey and pollen source plant cultivation base has been built. A new bee product processing enterprise has been established, and a new honey processing production line has been added to the Agricultural Comprehensive Reform Project. The construction of bee product processing facilities and honey exhibition halls has been completed. Through the Agricultural Comprehensive Reform Project and Bee Quality Improvement Action Project, we have purchased honey plants, bee species, and beehives to support beekeeping demonstration households. Currently, 30 beekeeping demonstration households have been established, covering 1500 acres of honey plants. A total of 1350 sets of bee species, beehives, and beekeeping utensils have been distributed, and an additional5050 sets will be distributed in 2023.

2.2 Aquaculture Technology Status

At present, the breeding status of Chinese honeybees in the bee industry in South China is affected by various factors such as climate, season, honey source, colony vigor, and separation period. The quality of queen bees cultivated varies greatly, and the species characteristics of Chinese honeybees are difficult to improve, resulting in a decrease in productivity and low economic benefits of beekeeping. Overall, it has been found that the introduced varieties are disorderly, and the self breeding and autotrophic varieties are degraded. Many bee colonies experience separation and queen death when there are 3-4 or even 2 spleen bees, or continuous separation leads to a decline in colony vigor. Secondly, the resistance of bees in South China to insect diseases is weak, and during the outbreak of diseases, all bee farms are immune, such as nest insect disease, European larval disease, and cystic larval disease. When the diseases are severe, it is easy to cause flight and weakened group dynamics, with most bee farms losing up to30%.Varietydegradation, a decrease in the number of strong groups, an increase and decline in the number of weak groups, and diseases are currently the main problems in beekeeping in South China.

2.3 Degradation of high-quality bee species

At present, there are three main reasons for the degeneration of bee species in South China. The first is the change in breeding conditions. Chinese honeybees, also known as native bees, are one of the varieties of Chinese honeybees. South China honey bees have strong adaptability and rarely get sick, especially in mountainous areas where the pollution-free and pure natural ecological environment is very favorable for bee reproduction. However, in recent years, with the planting of a large number of sugar oranges and the use of pesticides in mountainous areas, the living environment of bees has been increasingly damaged. In addition, various weather changes have caused a sharp decline in the originally good honey source plants in mountainous areas. For example, in the climate conditions of spring ice, low freezing temperature, and low temperature for several years, honey plants are unable to provide nectar and pollen normally. If beekeepers use syrup to feed or feed them insufficiently, they face the risk of high mortality rates in bee colonies. Therefore, it is necessary to retain enough original honey from previous years for feeding. As the amount of nectar and pollen that bees can collect from the outside becomes less and less, the change in breeding methods is to expand the range of nectar diameter and ensure survival and reproduction through small groups and multi-point distribution. However, large-scale breeding farms make it difficult to manage and manage them separately, which consumes a lot of manpower and material resources. This canlead to a decrease in the tendency of strong bees to separate and an increase in weak groups. Secondly, the selection of queen bee species is also one of the key factors affecting the production performance of bee colonies. A good queen bee refers to a queen with a strong physique, a large number of ovarian tubes, and sufficient fertilization. In addition to selecting excellent queen bees, mastering mature queen rearing techniques is essential to preserve the various performance of the bee colony. The queen bees cultivated in natural queen beds are random, and their genetic traits are similar to those of their parents. Although they can better preserve the traits of their parents, there is a lack of opportunities for selecting excellent traits. The quality and quantity of queen bees cultivated are limited, and the departure time is not uniform, making them unsuitable for large-scale queen exchange in large-scale bee farms. Thirdly, the

management level is relatively low. Currently, most beekeepers are middle-aged and elderly, with a low level of knowledge and weak ability to accept new beekeeping technologies and methods. In addition, due to factors such as the old concept in the market accepting honey from traditional beekeeping methods, some beekeeping farms adopt the South China beekeeping technology, which has drawbacks such as poor insulation performance and excessive interference. Compared with traditional old beekeeping methods and outdoor survival, traditional beekeeping technology has to some extent affected the breeding environment inside beehives in South China. In summary, it can be seen that there are multiple factors affecting the degeneration of bee species in South China. Bee farmers need to carefully analyze the root causes and take targeted measures to ensure the high yield of strong bee populations in South China.

3. Key Points Of Efficient Aquaculture Technology

3.1. Scientific selection of beehive sites to ensure the quality of bee species

The selection of beehives and beekeeping sites in South China, Mengshan County, is a basic prerequisite for ensuring strong swarms and high honey production. South China honey bees have the characteristics of cold and drought resistance and strong adaptability. The key to on-site beekeeping is the honey and pollen source plants. Within a radius of 3 kilometers around the site, there should be two main honey and pollen source plants and abundant auxiliary honey and pollen source plants within a year, and the combination of main and auxiliary honey and pollen source plants should be suitable. Therefore, when choosing a site, it is important to pay attention to whether the surrounding honey resources are abundant. For example, in forest areas with abundant forest plants, there are more than20% of honey source varieties of plants. Using forest edges and nursery spaces to build breeding bases, there are two very important reasons for examining the honey source situation when selecting a site. The honey flow period of bulk commodity honey sources is related to honey production, and the auxiliary honey powder sources are related to the cost of beekeeping and the health of bee colonies. When selecting a bee farm, not only should the distribution of bulk commodity honey sources be considered, but also the distribution of auxiliary honey powder sources should be considered. The importance of auxiliary honey powder sources for bee colonies is no less than that of bulk commodity honey sources.

In addition, the selection of bee farms should also be kept away from roads, mines, factories, and other places to avoid the impact of vibration interference and human and animal disturbance. When selecting beehives, it is advisable to choose beehives that have been used to raise bees. If a new bee hives are used, a small amount of beeswax should be applied in advance to cover and eliminate the original wooden odor. The hive door, gate, and through-hole on the gate should be complete, which can effectively prevent the escape phenomenon caused by odor stimulation and provide good conditions for ensuring the quality of bee species.

3.2 Scientific feeding, ensuring yield and improving efficiency

The scientific, hygienic, and healthy breeding methods of Chinese honeybees in South China should follow the basic principles of no pesticide residues and high-quality production. Firstly, it is necessary to construct a healthy breeding environment based on the living habits of Chinese honeybees, such as whether the water source ventilation conditions are available, whether the drainage and shading conditions are good, whether they are far from livestock and poultry farms, and whether the breeding base has high-quality water sources, which are all important elements of a healthy environment. For example, when the bee farm is located in a puddle in a gentle slope forest, it is necessary to ensure that the distance between the beehive and the ground is sufficient for the bees in South China to carry out honey production work normally; High quality water sources and distance from livestock and poultry farms ensure clean and hygienic water intake. In addition, for the small environment of beehives in South China, where most bees live, it is necessary to control the temperature reasonably, shade in summer, and keep warm in winter to ensure the quality of Chinese honey. Secondly, in the process of raising bees in South China, many beekeepers believe that additional pollen is not necessary. In recent years, due to the influence of the environment and climate, low temperatures, droughts, and other factors, many honey source plants have delayed flowering time, and even significantly reduced honey secretion and pollen discharge. In special periods, artificial pollen needs to be artificially supplemented to ensure sufficient nutrition for bees. High quality bee pollen is selected during the pollen feeding process, and if conditions permit, ultraviolet disinfection of pollen is carried out. If the original honey from previous years is retained,

it can also be used to feed the bee colony, maintain the normal growth of the bee colony, and maintain stable production and benefits.

3.3. Timely honey extraction to improve production performance

The ultimate goal of beekeeping is to obtain honey, and the time and quantity of honey retrieval greatly affect the subsequent production of bees in South China. Bees can be divided by season into spring honey, summer honey, and winter honey. But winter is the season when all things are dormant (except for Lingnan). For bees and the raw material pollen of honey, winter is a time when it is not easy to produce honey. Therefore, except for winter, honey from the other three seasons can be harvested. Of course, the time and pattern of honey collection may vary in each season. Spring is the season when a hundred flowers bloom and all things recover. With the opening of flowers and the awakening of bees, the storage of honey begins to increase. In spring, we should collect honey as early as possible. In summer, with the decline of flowers, the storage of honey begins to decline, so we need to work harder and seize this last moment. From the end of autumn to the beginning of spring, there are very few blooming flowers, so our honey picking time in autumn should become relatively stable. Harvesting honey during the mature stage after sealing can not only obtain high-quality honey, but also contribute to the sustainable production of bees. Therefore, the amount to be taken and kept depends on the situation. Once the weather changes, it is not possible to take all the honey. Adequate honey should be kept to ensure the feeding of the bee colony. When the honey source is insufficient, not only should it be taken less or not taken, but additional sugar feed should also be provided. The time for collecting honey is very important, and improper timing can easily lead to phenomena such as bee theft and colony escape. There are rape flower fields around. The honey extraction season can be determined according to the growth of rape flowers. From the middle of rape flowering period to the Mid-Autumn Festival, honey can be obtained. In the middle stage of rapeseed flowering, the reproductive rate of the Chinese bee reaches its peak, and a large number of insect eggs and spleens appear, resulting in an increase in pollen yield. As a result, there is not much honey, so the yield is relatively low. And it is also in the dividing period of bees, with the highest honey production around three weeks after the last bee division. The weather temperature determines the time to collect honey, and the temperature is relatively warm. It should be done every night. At night, bees have less attendance, and most worker bees return to their nests. After harvesting honey, it is important to ensure that there are sufficient worker bees and time to repair the damaged nest spleen. The temperature is low and should be conducted in the morning and noon. In winter, if there is enough offspring to ensure that bees can survive the winter, during the coldest period, no honey is taken, except for the period when duck feet are flowing honey [1].

4. Innovative Management, Strong Teamwork, and High Productivity

4.1. Promote efficient and high-yield live frame aquaculture technology

Promote efficient and high-yield live frame breeding technology, timely separate bees and collect honey. Traditional breeding methods can only collect honey once a year, with less than 20 pounds per box; Live frame farming can extract honey 3 to 4 times a year, with around 30 pounds per box taken each time. Adopting a new type of high narrow beehive double box breeding, CNC management is implemented for the feeding ability, growth rate, and optimal colony potential of the bee colony at each stage, achieving high and stable yields in beekeeping. In the spring and autumn seasons, when the bee colony develops to around eight spleens, it will produce a queen's nest, which is a sign of bee fever. Even if the queen's nest is destroyed, a new base will still appear the next day, allowing the mature queen's nest to avoid the succession box, resulting in a very low yield of the bee colony during the rapeseed flowering period each year. After the death of the queen bee, the worker bee colony will fly everywhere, and after about ten days, the yellow bees will gradually turn black, indicating signs of extinction in the entire colony. In the autumn or late autumn of the year before spring reproduction, it is necessary to keep 3-4 whole worker beehives without male beehives in each group for future use; All excess spleens should be classified, such as "big powder big honey spleen", "big powder small honey spleen", "small powder spleen", "little powder spleen", "honey spleen", and "empty spleen". After classification, they should be marked, smoked with sulfur, wrapped and set aside; Old spleen needs to be eliminated.

4.2. Queen Bee Cultivation Strong Colony

Artificial breeding of high-quality queen bees ensures that the queen has excellent genetic traits, can maintain a larger colony size, strong stress resistance, and strong worker bee collection ability, greatly improving the economic benefits of

bee breeding. The queen bee plays a crucial role in the breeding process, and a long and stable queen bee can be used for two to three years. The quality of the queen bee depends on the amount of royal jelly obtained during the larval stage and stable nest temperature. Adequate honey powder in the nest is also a prerequisite for cultivating high-quality queens. Therefore, the breeding queen group needs to have strong momentum and sufficient feeding bees. The queen rearing colony should have a size of at least 6 frames, and there should be more lids and young bees inside the nest, with a small number of male bees, and a colony that has already produced bee fever. This type of colony has a high acceptance rate of queen beds after migration, and the quality of queen rearing is good. If the group dynamics of the parent group meet the above standards, it can be used as a parenting group. For the breeding king group whose group size does not meet the standard, it can be supplemented by selecting mature sealing caps from other groups to quickly expand the group size and achieve the standard of producing bee fever. In late autumn, the new queen with weak bee characteristics will replace the old queen, laying the foundation for the bee colony separation situation in the following spring, improving the colony's production capacity, and promoting the continuous growth of the colony. To cultivate a queen, there should be abundant conditions for honey powder sources, and the construction of excellent queen colonies is in the stage of abundant honey powder sources. From the peak of bee colony reproduction, the process of migration, emergence, mating, oviposition, and even withdrawal shall not be less than one month. Therefore, there should be a continuous honey powder source for about 40 days. The breeding of queen bees, whether purchased or self cultivated, should choose bee species with high yield and strong disease resistance. Most of the queen bees in South China begin to degrade after a few months of use. It is recommended to frequently replace the queen bees and shorten their lifespan to control the frequent occurrence of bee fever. In addition, during the autumn breeding period, the strength of the queen bee substance can be used to cultivate strong colonies. For example, when the colony reaches eight spleens, the queen bee can be raised to the relay box for breeding. The relay box contains four spleens, and the remaining nest spleens are placed in the nest box[2]. The purpose is to weaken the queen bee substance in the nest box and strengthen the queen bee substance in the relay box. Two honey powder spleens, one larval spleen, and one oviposition new spleen are placed in the relay box. When the lid spleen appears, it is transferred to the nest box to ensure that 65% of the queen bee substance is concentrated in the relay box, promoting the continuous upward development of the colony. In recent years, some bee farms have achieved good results in not distinguishing bees with more than 13 spleens, greatly improving the egg lay in grate of queen bees.

4.3. Turning to other places to release bees, scientific prevention and control measures

Choosing a good route and selecting areas with abundant bees is necessary for transferring bees to other areas. Mastering the blooming and falling time of each honey source can achieve better yields through small transfer of bees. Before transferring land, it is necessary to investigate the climate, honey sources, and other conditions of the new site, and plan the length of the journey, departure date, and transportation tools reasonably. For example, in hot weather, when transferring to another location, a standard box should not exceed six boxes of bees, and the comb should be lightweight and fast to avoid bee theft. The time should be chosen to switch to another location in the morning or evening to avoid the phenomenon of bees suffocating or nest spleen collapse caused by sun exposure. Before the beginning of spring, it is necessary to keep warm in a timely manner but not excessively, to avoid the occurrence of cold bees freezing and death, and the dispersal of overheated bee colonies. Scientific temperature control should be used to expand the spawning circle. After arriving at the new site, the beehives are arranged in groups and dispersed, and the hive doors are opened in batches while paying attention to the flight of the bees[3]. At dusk, the packaging is removed and the beehives are inspected, and any adverse phenomena such as crushing the queen bee and dropping the spleen are promptly dealt with. In addition, in the process of bee breeding in South China, disease prevention and control are carried out. The most common cystic larval disease mostly occurs in summer. Therefore, when the temperature exceeds 35 degrees Celsius, the beehive should be placed in a cool and ventilated place in a timely manner, and water and honey feeding methods should be adopted to provide a good and healthy living environment for bees. Keep the beekeeping clean and reduce the efficiency of disease transmission. In the specific breeding process, once bee farmers discover that bees are infected, they should immediately isolate the infected bees and have professional epidemic prevention personnel diagnose the diseases in the bee colony, take corresponding prevention and control measures, and diagnose the infected bees.

Diseases can be treated by boiling Wujiapi, Banlangen, and Honeysuckle into syrup with water for comprehensive prevention and control of diseases and pests. August in Mengshan County is an excellent time to prevent and control diseases and pests due to high temperatures, low birth rates, and a shortage of flower sources. On the one hand, feeding medicinal pollen is used for prevention and control, and the powder should be mixed into a paste or dough for artificial feeding. It is best not to use medicinal syrup for feeding. On the other hand, it is necessary to use formalin or sulfur to fumigate and disinfect the box spleen in stages and batches, or to use methods such as roasting, sun exposure, and freezing the beehive to eliminate pathogens and further reduce the number of pathogenic viruses.

5. Conclusion

In summary, Mengshan County has a strong and high-yield bee colony in South China, promoting efficient and high-yield live frame breeding technology, scientifically selecting beehive sites, breeding excellent varieties, and scientifically feeding and producing honey in a timely manner. Timely land transfer, strong and high-yield colony, scientific disease prevention and control, improving honey yield and quality, and promoting the sustainable and healthy development of the beekeeping industry.

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