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Strategic Thinking and Measures for Plant Quarantine and Food Safety

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Abstract This paper describes the importance of plant quarantine to the food safety in China through cases where plant quarantine helps to effectively intercept harmful organisms for food safety and promote export and import trading. It also presents the existing problems in plant quarantine work and appropriate measures.

Key words Plant quarantine, Food safety, Thinking, Measures

Since the foundation of the People's Republic of China, Chinese government has attached great importance to the agriculture and food safety. They always place the agriculture industry as the top priority of national economy, and consider food as the "fundamental foundation" of national economy in China. Article 1 of *Regulations on Plant Quarantine* sets forth that these Regulations are formulated for the purpose of preventing harmful diseases, insects and weeds dangerous to plants from spreading, and of protecting agriculture and forestry safety production. Based on the formulation purpose of *Regulations on Plant Quarantine*, it can be concluded that food safety is heavily reliant on plant quarantine. The ultimate aim of plant quarantine work is to prevent harmful diseases, insects and weeds dangerous to plants from spreading nationally and internationally, protect agriculture safety production, maintain trust in both domestic and foreign trade, and fulfill national and international obligations. We describe the importance of plant quarantine to the food safety in China through cases where plant quarantine helps to effectively intercept harmful organisms for food safety and promote export and import trading, and present the existing problems in plant quarantine work and appropriate measures, so as to provide reference for related departments to carry out safety and security work for food production.

1 Importance of plant quarantine to the safety of food production

Plant quarantine is an integral part for plant protection. It covers various aspects of plant protection, including prevention, eradication and elimination of harmful organisms, and sometimes it is even the only specific measure for the Integrated Pest Management (IPM) program.

1.1 Plant quarantine is an important guarantee for food production safety

1.1.1 Invasion of alien species has caused tremendous losses. Official statistics in China shows that, in 2005, alien weeds that have been found in China is up to 107 types, alien bacteria 23 types, and alien pests 32 types. The invasion of these organisms has caused great damages to the production of agriculture and forestry, the biological diversity, the ecological environment and the social economy. According to statistics of the department concerned, the invasion of harmful organisms has caused a loss of 57 400 million yuan each year to China's economy, and the money invested each year to prevent and kill invading pests is up to 1 400 million yuan^[1].

1.1.2 The losses recovered through measures of plant quarantine for food production safety is huge. *Lissorhoptrus oryzophilus kuschel*, one of the internationally recognized most destructive pests to paddy rice, is an international pest of plant quarantine as well as a harmful pest of plant quarantine in China. Since it invaded Tanghai County, Tangshan City, Hebei Province in 1988, up to now it has been found in local areas in 14 provinces in China. Each province has actively responded to it by carrying out plant quarantine, plotting out epidemic areas and protection areas, and making proper blocking, quarantine, control, eradication and prevention measures, to minimize the loss of paddy rice production in China. Taking Zhuzhou County in Hunan Province as an example, the yield of paddy rice in Zaohechong Village, Nanyangqiao Town, has generally reduced by 50% after invasion of *Lissorhoptrus oryzophilus kuschel*. The government of Hunan Province paid close attention to food production, took practical effective measures against this invading pest, including effective interception and scientific control, and recovered a loss of 917 000 ton rice in total, which amounts to 12 800 million yuan^[2].

In recent years, with the construction of interception zones, plant quarantine work in China has eliminated the invasive trogo-

derma granarium, radopholus similis, broad bean strain virus (BBSV) and other harmful organisms for quarantine in local areas. It also blocked effectively solenopsis invicta, verticillium albo-atrum and other harmful organisms in local areas, so that their spreading speed is greatly reduced. Taking Guangxi Zhuang Autonomous Region, a large coastal and frontier agriculture region, for example, with the increase of trading volume of agricultural products, the quarantine harmful organisms has reached 10 types in recent years, which is over three times as many as those in 30 years ago. The quarantine department of agricultural plants in Guangxi Province has set up proactively 190 monitoring stations for major agricultural plant epidemics in 49 counties (cities), constructed strict interception zones for epidemics, successfully prevented the invasion and spreading of lissorhoptrus oryzophilus kuschel, grape phylloxera and other epidemics, eradicated sporadic epidemics such as sternochetus pierce, radopholus similis, and Johnson grass, effectively controlled 8 major plant epidemics including xanthomonas campestris pv. oryzicola dye and banana wilt, and recovered losses of 1,800 million yuan^[3].

1.2 Promotion effects of plant quarantine on export and import trading in China

Since the implement of reform and opening police, the work of plant quarantine has developed continuously, made great contribution to export and import trading promotion, and yielded remarkable economic benefits.

1.2.1 Quarantine of imported plants. From January to October in 2006, the entry-exit inspection and quarantine authorities have intercepted harmful organisms 2471 types in 104,000 times. On March 15, 2007, Waigaoqiao Entry-exit Inspection and Quarantine Bureau of Shanghai discovered trogoderma granarium, a type of prohibited harmful organism, in the imported Turkey linter. They immediately fumigate thoroughly all the 1 645 tons of turkey linter packed in 71 containers measuring 12.192 m in height, which is worth 410 000 US dollars. The plant quarantine measures not only recovered huge economic losses for the import enterprise, but also effectively prevented the harmful organism. In 2008, Yunnan Inspection and Quarantine Bureau found 5956 batches of harmful organisms in 9491 times in inbound animals and plants, increased by 26.78% and 28.83% respectively compared with the year 2007. Among these organisms there are 28 types of dangerous harmful ones discovered in 593 times, increased by 16.66% and 21.27% compared with the year 2007. On the whole, the detection rate, execution force, epidemics treatment abilities of various inspection and quarantine bureaus and plant quarantine departments have increased a lot.

1.2.2 Quarantine of exported plants. America, Canada and Australia are the countries that have the most strict fruit quarantine access, and it has always been difficult for fruits produced in Shanxi Province to access high-end markets, especially the American market. In order to speed up fruits of Shanxi to get access to America, Canada and Australia etc., in 2009 Shanxi Entry-exit Inspection and Quarantine Bureau studied the regulations on target countries for export to help local governments strengthen

the construction of fruit bases in the province on one hand, they encouraged quarantine delegations from the three countries of America, Australia and Canada to inspect for risk assessment and quarantine access of fruits of this province on the other hand. Now, Shanxi fruits have accessed international high-end markets.

1.2.3 Interpreting SPS Agreement correctly and break technical barriers. According to applicable regulations (of SPS Agreement) "when an export country has sufficient evidence to prove that there are non-epidemic regions of certain harmful organism in the country, the import country shall admit it and shall not restrict the import of such agricultural products for the reason of presence of such harmful organism in the export country." China has made great efforts in construction of non-epidemic regions. Japan once refused import of Chinese fruits because there are bactrocera cucurbitae in China. Later, a consensus is reached that Xinjiang region is free of this pest after onsite inspection, survey and research by quarantine departments from both sides, and honey-dew melons of Xinjiang finally are exported to Japan. In addition, our apples imported from Washington of America as well as apples and kiwi fruits from the non-epidemic regions of Chile all rely on the interpretation of non-epidemic region. The construction of non-epidemic region not only effectively prevents harmful organisms from spreading from and to this region, but also boosts the development of trading; therefore, the plant quarantine work in the future should be steered towards it.

2 Existing problems in plant quarantine work and appropriate measures

The construction of interception zones has neither effective, sufficient technical and financial support, nor consistent legal specifications.

2.1 Restricted by the current level of science and technology, it is difficult to detect immediately at the port many quarantine harmful organisms, especially some bacteria and viruses, through the transit quarantine This is because on one hand there is no fast sensitive test reagents for inspection of bacteria and viruses, so it is impossible to carry out library test for each batch of goods under heavy work load of onsite quarantine before the goods leave the port, with the great increase of species in quantity and batches; on the other hand, the current epidemic situation treatment is far from satisfying the fast, effective and economic requirements.

2.2 Quarantine, especially plant quarantine, in China lacks special funding support It is always the case that the government begins to input great manpower, material supplies and financial resources only when serious epidemic occurs. In fact, once an epidemic is spread into a region, it would be difficult to eradicate it, and it would be rather satisfactory if the epidemic could be confined in the local region. The epidemic monitoring of quarantine harmful organisms is an inertia process. It is substantially different from forecast of pests and diseases as the former focuses on whether it exists or not, but the latter focuses on the size of it.

Project funds provided by the government each year is allocated mainly for prediction, forecast and comprehensive prevention and control of pests and diseases. Though the comprehensive prevention and control include plant quarantine, as there is no fixed distribution, the funds that can be actually used for epidemic monitoring, origin quarantine and transport quarantine is very limited.

2.3 Internal and external quarantines are separated Internal and external quarantines are governed respectively by Ministry of Agriculture, Ministry of Forestry and General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, which are mutually independent and have different functions, and they execute respectively the agriculture part of *Regulations on Plant Quarantine*, the forestry part, and *Law of People's Republic of China on the Entry and Exit Animal & Plant Quarantine*. As their legal statuses are unequal, the effects of law enforcement are greatly different. The relationship between agricultural quarantine and port quarantine is inharmonious, and methods, procedures and standards of quarantine are inconsistent; therefore the law enforcement image is confusing, the public trust and execution ability of the government's quarantine willingness is not well exhibited.

3 Measures for inspection and quarantine

3.1 Technical support Both the blocking and eradication of major quarantine harmful organisms in local areas and the precaution of serious alien harmful organisms require scientific and appropriate technical supports. To guarantee the strengthening of plant quarantine work in China, it is important to establish a team of experts from plant quarantine authorities and institutes and universities of scientific research, carry out various technical breakthrough researches on quick identification, monitoring and control of quarantine harmful pests, point out the key harmful organisms that should be prevented in different periods and stages in China based on the adaptability research of harmful organisms and the distribution of farm crops in China as well as the export and import conditions of agricultural products, make atlantes, and provide effective monitoring measures. Related institutes and universities of scientific research shall assist in identification of new harmful organisms, study key technologies for control over epidemic situations, and provide necessary professional training and technical support for quarantine personnel.

3.2 Funds guarantee To make the plant quarantine work progresses smoothly, necessary guarantee of measures and capitals shall be provided. To ensure the successful implementation of plant quarantine work, each plant quarantine authority shall try to obtain special funds for monitoring and control of major epidemic

situation, reinforce the propaganda of quarantine, attract local government's focus to include the expenses required for construction of interception zones into the fiscal budget of government in the same level, increase capital input to further improve and enhance the monitoring, detection, inspection and quarantine measures of the interception zones, guarantee the funds required for normal operation of plant quarantine authorities and for the monitoring, eradication and blocking of epidemics, and establish a long-term effective mechanism for plant quarantine and epidemic prevention.

3.3 Construction of laws and regulations Improved policies and regulations form an important guarantee for well-done plant quarantine work. With nearly 30 years' practice of *Regulations on Plant Quarantine*, a set of feasible administrative system for quarantine propaganda, training, epidemic situation monitoring for quarantine harmful organisms has formed; urgent problems that need immediate solution with respect to aspects of international standards, market economy, work division and coordination of agriculture and forestry quarantines, connection of regulations with entry-exit laws become increasingly clear; requirements of international agreements and quarantine have been understood ultimately; well established quarantine laws and regulations in foreign countries can be learnt, and there are proper legislation conditions for plant quarantine in China^[4]; Therefore, construction of a new system of plant quarantine laws and regulations should be the guiding thought for plant quarantine legislation in the future in China.

3.4 Strengthening national and international epidemic situation monitoring Nationally, perform general investigation of epidemic situations periodically; internationally, collect extensive, comprehensive and real-time information about plant epidemics occurring throughout the world and publish the information timely on internal websites, to let quarantine personnel carry out quarantine at ease to reduce or eliminate invasion or spreading of quarantine harmful organisms and safeguard the safety of agricultural production in China.

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