How the Japan Crop Protection Association ("JCPA") helps realize more productive agriculture and sustainable food systems

Introduction

Japan is located in the warm and humid Asian monsoon region. While its climate conditions make it possible to cultivate a variety of crops, those conditions are also suitable for the outbreak of insects, diseases, and weeds. Thus, the question of how to protect crops from such plant pests is a major issue for stable food production.
This is an introduction to how Japan's crop protection industry plays a key role in realizing productive agriculture and sustainable food systems.

1. The situation surrounding food production

20 to 40 percent of the edible crops in the world are lost through damage from plant pests, and hundreds of millions of the global population are suffering from the shortage of an adequate supply of food. Therefore, the Food and Agriculture Organization of the United Nations ("FAO") has stated the importance of developing political measures and starting to act on protecting crops from plant pests.
Heading: FAO "The International Year of Plant Health"

In recent years, cross-border plant pests have been rampant in the world, with reports of desert locusts in East Africa, fall armyworms from Africa through Asia, and brown planthoppers in Japan. In addition, the pandemic of Covid-19, along with existing crises such as climate change, floods, droughts, and plant pest outbreaks, has posed complex threats, including strained food systems and global food insecurity. FAO has called for taking measures responding to those concerns.
Heading: FAO COVID-19 Response and Recovery Programme

JCPA has set up a vision activity called "JCPA VISION 2025", which is designed to guide its contribution to agriculture. The policies of this activity are associated with the SDGs adopted by the United Nations. The association supports the sustainable supply of food through promoting the role of crop protection and makes efforts to raise public awareness of the importance of crop protection products (CPPs).
Heading: JCPA Vision

2. Agricultural policies in EU and the United States of America

The governments of Europe and the United States have announced their agricultural policies that aim to reduce greenhouse gas emissions.

In February 2020, the U.S. Department of Agriculture released the "Agriculture Innovation Agenda", in which agricultural innovation is listed as a key tool that helps farmers and consumers solve environmental issues. The U.S. government aims at building up a comprehensive innovation strategy in the agricultural field, including reinforcing the environment of research on agricultural productivity.
Heading: USDA " Agriculture Innovation Agenda "

The European Commission announced its "Farm to Fork Strategy" in May 2020. The EU strategy covers the entire agricultural and food chain from producers to consumers, and it is directly and indirectly related to the field of crop protection. The strategy includes food security, an outlook on the environment, climate change, and the recovery of bio-diversity. Specific goals are stated for the part of crop protection, such as the reduction of chemical CPPs and expansion of organic farming.
Heading: European Commission "The Farm to Fork Strategy"

In November 2020, the U.S. Department of Agriculture released a report in which they had simulated the consequences that could result from the implementation of the specified goals in the EU "Farm to Fork Strategy", including the reduction of chemical CPPs and fertilizers. The report states that the EU strategy could lead to a decrease of agricultural production, higher consumer prices, reduction of the world GDP, and consequently, further global food insecurity.
Heading: USDA report

JCPA believes it is important to create innovations and promote technologies in the field of agricultural production. You can visit our website to see the technological innovations that are developed and promoted on a global basis for higher production of agricultural food.
Heading: Innovation in Crop Protection Products (videos)

3. Efforts the crop protection industry makes

CPPs must be safe enough for users and consumers. They also must exert no more than the minimal impact on the environment. In addition, they have to have sufficient efficacy against the target pests and be easy-to-handle and cost-effective for farmers. JCPA member companies make every effort to meet those conditions by using a wide range of sciences.

The average application dose of the CPPs (active ingredients) that were developed in the 1960s was in the range of several kilograms/ha worldwide. This has dramatically declined to the range of several dozens of grams/ha for CPPs developed

in recent years. Looking at Japan's domestic market, advanced spray technology and the development of more effective CPPs have led to the reduction of CPP application by half over the past 30 years. JCPA foresees this trend to continue over the coming years.

CPPs applied in Japan have been replaced with those containing less human toxicity and environmental burden. In the 1950s and 1960s, Japan had many CPPs that were classified as poisonous or deleterious substances. However, recently, CPPs that are not classified as such toxic substances account for slightly less than approximately 90% of the total CPPs used.
CPPs also contribute to lowering labor costs through reducing farmer working hours and shoring up shortages in the labor force, as we can see in the examples of weeding in rice paddy fields and thinning-out in apple cultivation.
JCPA member companies keep making efforts to create safer and more effective CPPs.
Heading: Crop Protection Market and Innovation
Heading: Innovation in Crop Protection Technology

4. Integrated Pest Management ("IPM")
There are various measures to protect crops from plant pests and weeds – control by chemical CPPs, by biologicals such as natural enemies, by using pest resistant varieties of crops, with advanced cultivation technologies, using physical protection with insect nets, and using sterilization by exposure to sunlight. It is important to choose one or more options that can be considered to be the most suitable for the cultivation conditions and for the outbreak of plant pests at the time of application. Chemical CPPs are a very important tool, but they are only one option among other options.
JCPA advocates IPM – integrated pest management – in which all possible measures for plant pest control are combined into one. The association aims to provide information on IPM to farmers and help its member companies develop programs on IPM. JCPA also considers the importance of ICM – integrated crop management – a more advanced idea which includes water and soil control along with IPM.
There are always concerns about the development of CPP resistance in plant pests. JCPA takes promotional activities for preventing resistance development by using a leaflet – "Do you know the RAC code?" – in which farmers can learn about crop protection using a rotation of CPPs with different modes of actions. The association also has prepared a guideline on the RAC code numbers, so its member companies

can use those defined code numbers for their product labels. That contributes to keeping the efficacy of CPPs stable and reducing excessive use.
Heading: Do you know the RAC code?

5. Organic farming
The market of organic products (including foods and textiles) is growing in Europe and the United States. In Japan, organic farming accounts for just 0.5% of the total agricultural land, but it is seen as a future growing segment.
Japan belongs to the warm and humid Asian monsoon region, and plant pests and weeds have been ever challenging in agricultural production. In recent years, cross-border pests such as fall armyworms and brown planthoppers have been on the rise. However, the impact of those pests has been limited due to the contribution of CPPs. They are used as a major part of plant pest control in 99.5% of the total agricultural land. Japan's Sustainable Food Systems Strategy – "Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI)" states in its key performance index that organic farming will increase to 25% of the total agricultural land by 2050. That means the country needs additional technologies that help protect such organic farms from plant pest pressures and maintain the productivity of Japan's agriculture.
Heading: MAFF "Measures against brown planthoppers in the production of paddy rice produced in 2021"
Heading: MAFF "Information on the Fall Armyworm"

Fusarium head blight in wheat causes mycotoxicosis in human beings. Chemical CPPs control Fusarium head blight and prevent the contamination of mycotoxin into wheat flour. Mycotoxicosis is one of the issues that organic farming must address from a food safety standpoint.
Heading: MAFF "Information about mycotoxins in food"

Organic farmers have only a limited number of chemical CPPs hat they can use for their products, so the farmers need technology innovations such as biologicals and pest/weed-resistant crops. Many JCPA member companies are dealing with the development of biologicals. A larger number of biologicals is foreseeable in the market as science progresses.

Conclusion
In Japan, the assessment of CPP registration is strictly conducted by the government under the Agricultural Chemicals Regulation Act. The government assesses the

dietary risk and the environmental risk of individual CPPs and secures the safety of humans and the environment based on the labeled use guidelines. CPP require numerous tests in the course from their discovery up through launching into the market. JCPA member companies comply with the test guidelines authorized by OECD and other international institutes for their safety evaluations, and supply safe and effective CPPs to the world.

Heading: CPP safety assessment in Japan

In 2020, the revised Agricultural Chemicals Regulation Act implemented new methods of risk assessment for worker exposure and honeybees. Also in 2021, the government launched a re-assessment system for CPP registration based on the latest scientific insights. JCPA continuously ensures the affordable supply of safe and effective CPPs. JCPA will also make every effort to create innovative technologies for more productive and sustainable agriculture in Japan – and the world.