International research collaboration to tackle transboundary plant pests

Kazuo Nakashima

Program Director, Stable Agricultural Production

Japan International Research Center for Agricultural Sciences

Transboundary plant pests are the biggest threats to global food security

Plant pests are responsible for 20-40% of losses in global food production

Climate change and global warming

Globalized movement of people and goods

Worsening damage creates global public concern across all countries and regions

JIRCAS 国際農研

Migratory insects

Desert locust
Mauritania
France

Rice planthoppers
Vietnam
Cambodia

Vector leafhoppers
(Sugarcane white leaf disease)
Thailand

Transboundary diseases

Rice blast
Philippines
Vietnam
Indonesia
Bangladesh

Soybean rust
Brazil
Paraguay
Uruguay
Mexico
Bangladesh

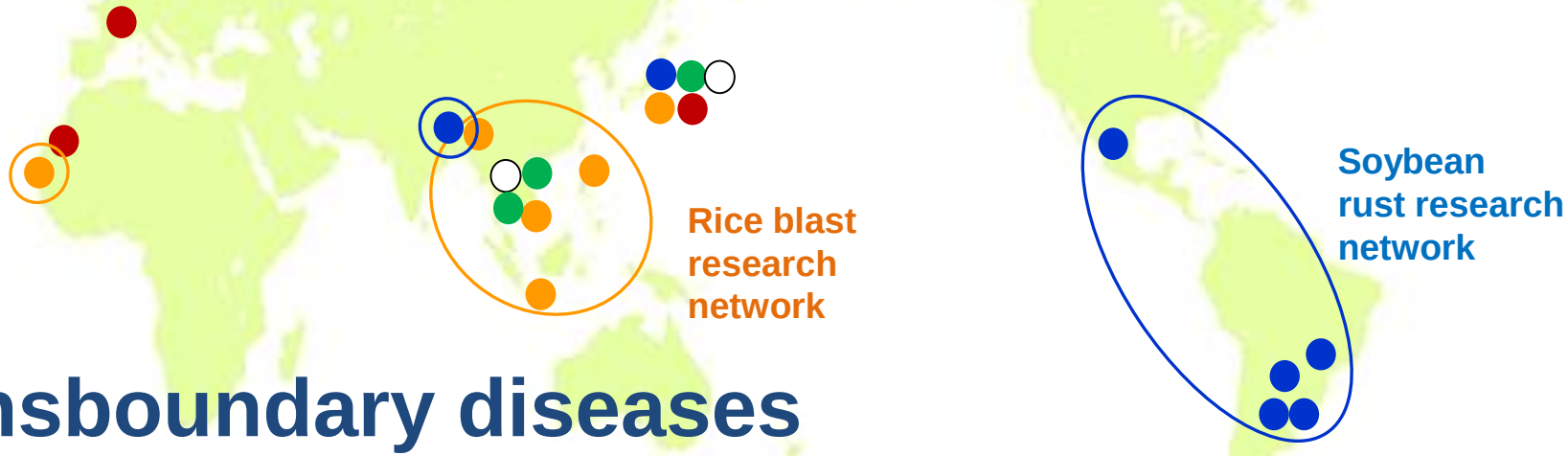
JIRCAS 国際農研

Migratory insects

Research cooperation

Ecology of target pest

Integrated pest management (IPM)



Transboundary diseases

Research networks

Resistance genes

Resistant varieties

JIRCAS 国際農研

Development of survey method and preventive control of desert locust

Solitarious phase

Phase polyphenism

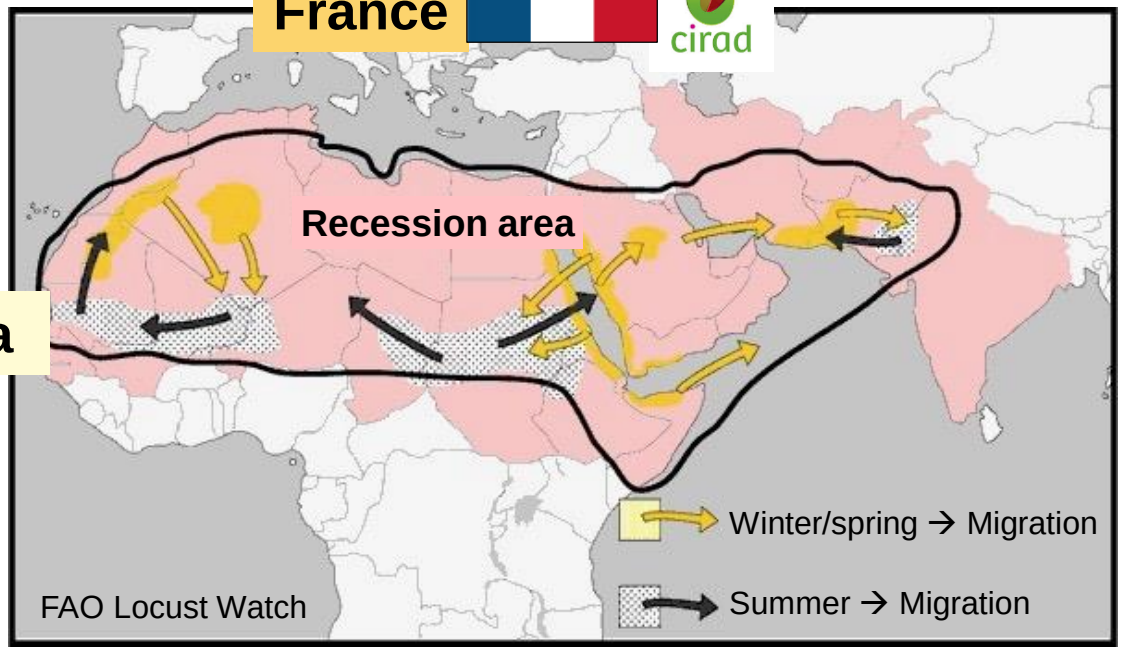
High population density

Gregarious phase

France

cirad

Mauritania



JIRCAS 国際農研

IPM system to control insecticide resistance in rice planthoppers

Japan

NARO

Overwintering areas

Vietnam

Cambodia

JIRCAS 国際農研

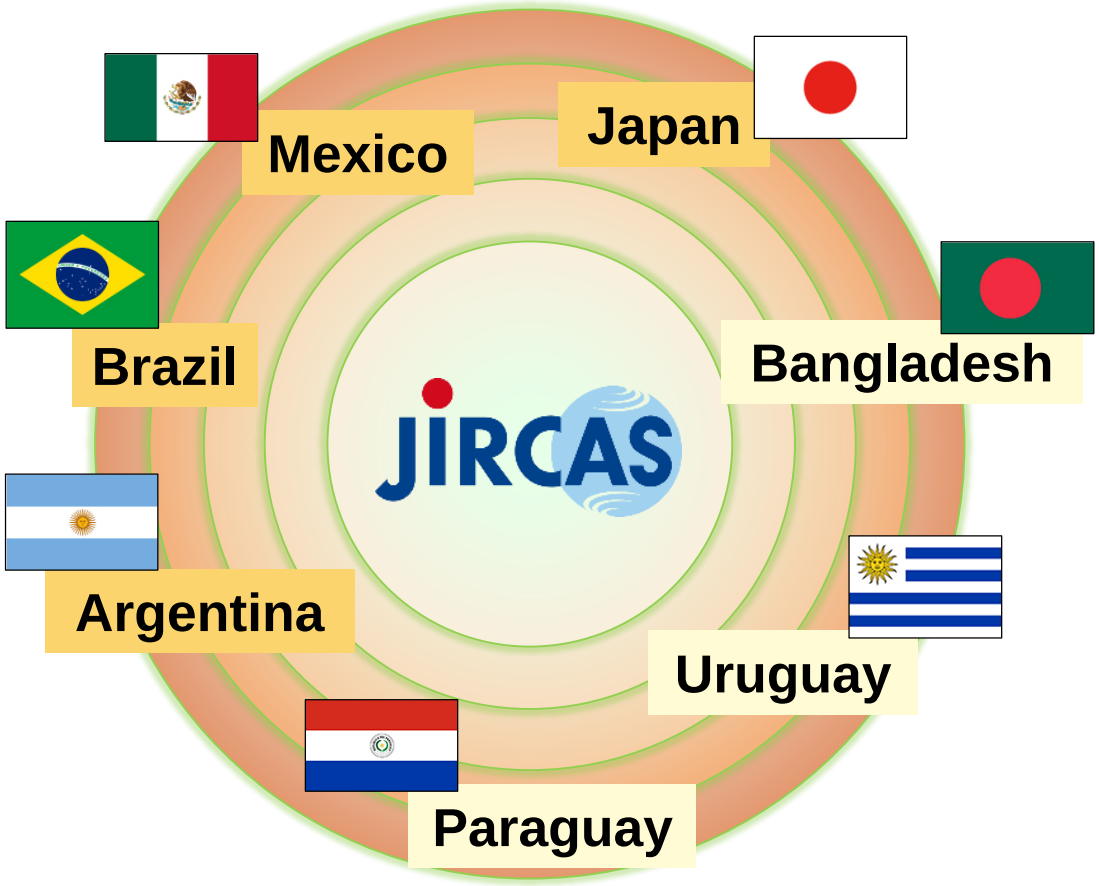
Combining true and field resistance genes for rice blast

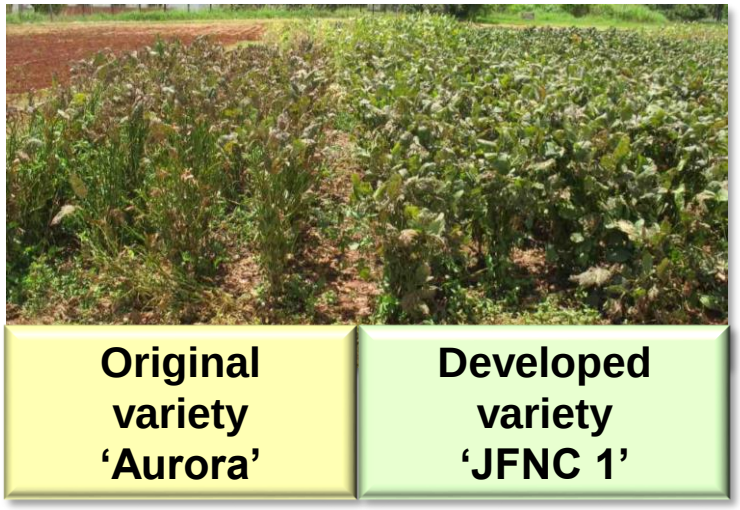
Differential system

		Blast isolates					
		A	B	C	D	…	N
Rice varieties	1	R	S	S	S	…	S
	2	S	R	S	S	…	S
	3	S	S	R	S	…	S
	4	S	S	S	R	…	S
	…	…	…	…	…	…	S
	n	S	S	S	S	S	R

JIRCAS 国際農研

Development of soybean rust resistant varieties by pyramiding resistance genes





Original variety ‘Aurora’	Developed variety ‘JFNC 1’

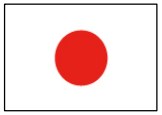
No **+ 3**

Resistance genes

JIRCAS 国際農研

Bilateral research collaboration funded by the Ministry of Agriculture, Forestry and Fisheries (MAFF)

Potato spindle tuber viroid
genome sequencing

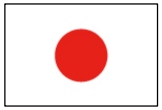


National Agriculture and Food Research Organization (NARO)

All-Russian Research Institute of Plant Protection (VIZR)

Far Eastern Research Institute of Plant Protection (FRIPP)

Barley yellow mosaic virus
genome sequencing



National Agriculture and Food Research Organization (NARO)

Federal Research Center for Cultivated Plants (JKI)

Effective control through the development of new resistant varieties will lead to stable global production in the future.

MAFF
Ministry of Agriculture, Forestry and Fisheries

Towards mitigation of transboundary plant pests

International research collaboration that includes developing countries

- International workshop
- Networks
- Research cooperation
- International organizations

↓

- Latest information on occurrence
- Early detection
- Prompt actions on prevention and effective control measures

↓

- Sustainable food production
- Conservation of environment

↓

JIRCAS 国際農研