Orchestra press conference

March 12th, 2021

日本農薬株式会社

Chemical Innovator for Crop & Life

殺虫剤

オーケストラ® フロアブル

A Novel Insecticide for Control of Rice Plant Hopper

Orchestra® Flowable

Active Ingredient : Benzpyrimoxan

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Biological Property

Research Division

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殺虫剤 オーケストラ®フロアブル

♪ **Excellent field performance with good residual activity against rice plant hoppers.**

♪ **High efficacy on rice plant hopper which is resistant against existing products by novel Mode of Action.**

♪ **Low impact on the natural enemies and honey bee, suitable for IPM* strategy.**

* IPM : Integrated Pest Management

Orchestra Flowable 1L
Product bottle appearance

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◆Economic Damage by Brown Plant Hopper

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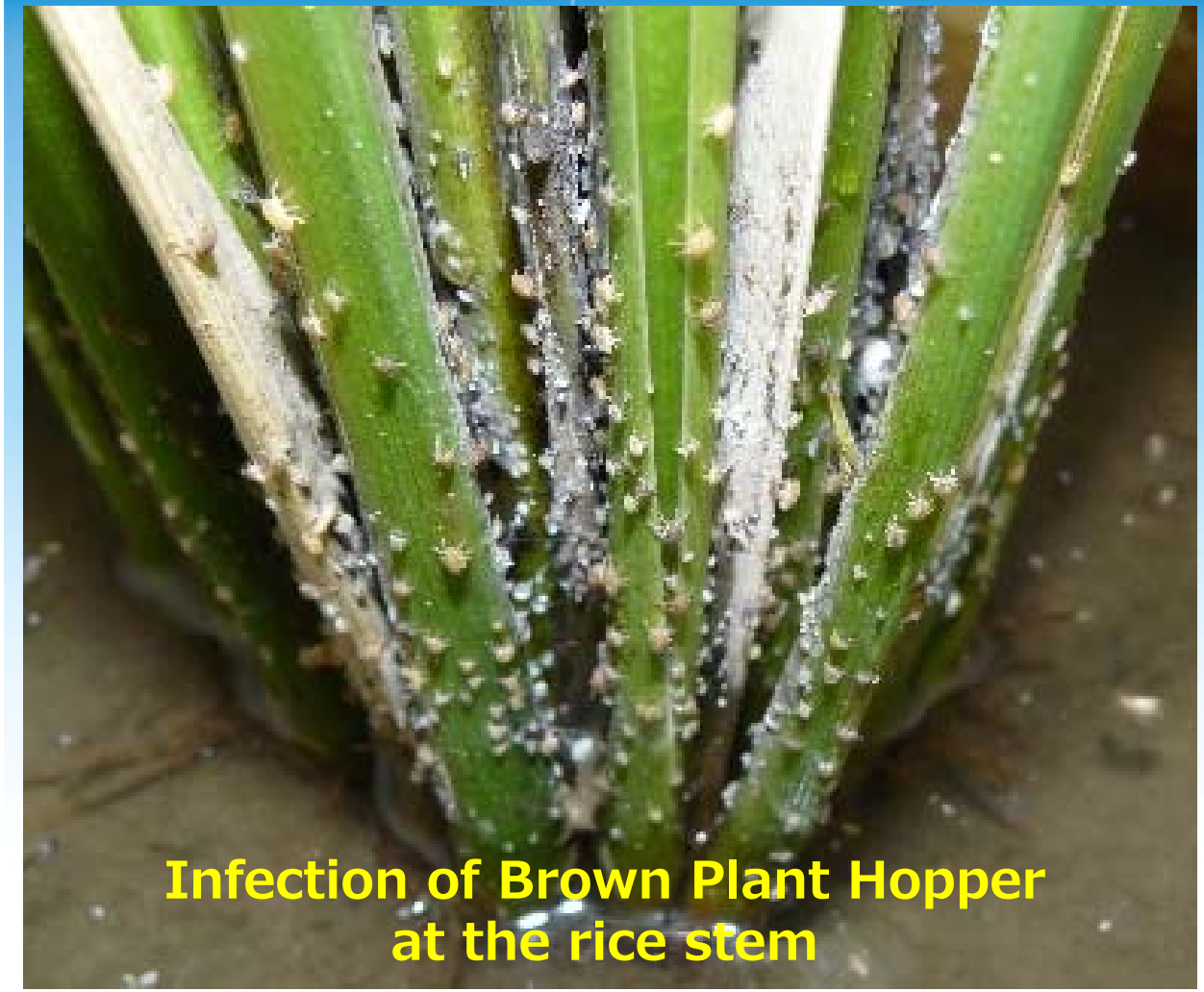
◆Brown Plant Hopper in Paddy



Infection of Brown Plant Hopper
at the rice stem

Brown Plant Hopper
Nymphs

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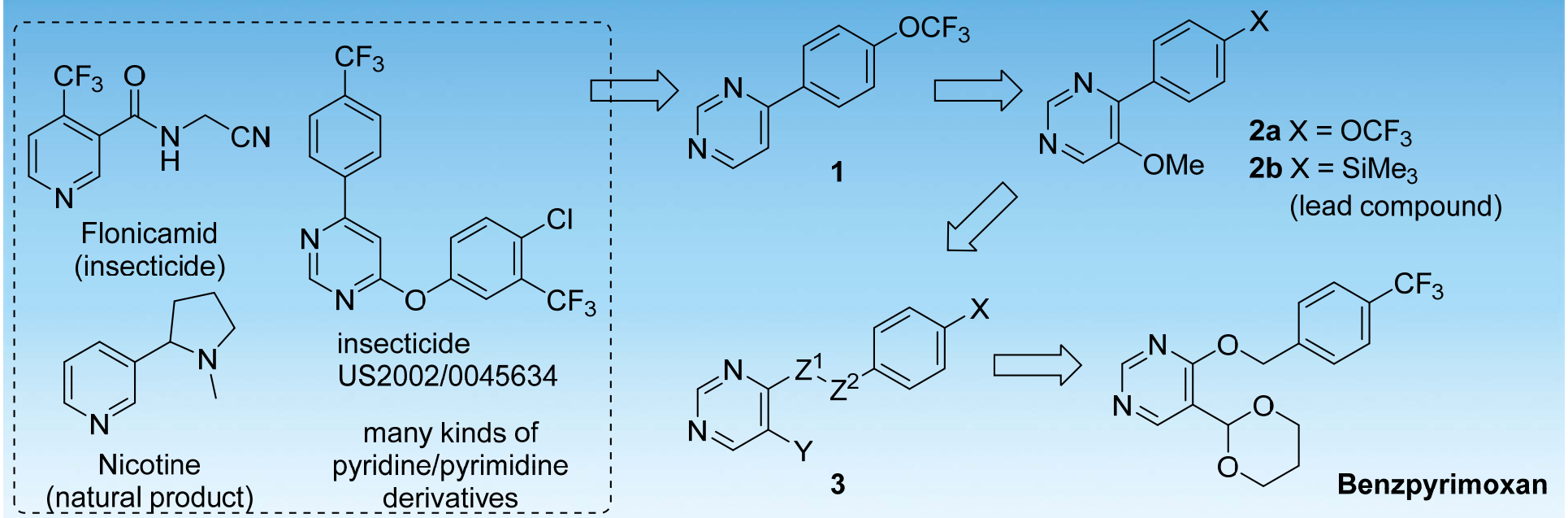
◆Discovery of Benzpyrimoxan



E. Satoh *et al.*: *Journal of Pesticide Science (in press)*.

♪ **Novel IGR* activity was discovered in primary evaluation (1)**

*** IGR: Insect Growth Regulator**

♪ **Optimization of chemical structure (1→2→3→Benzpyrimoxan)**

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◆Activity on different growth stages

1st instar

3rd instar

5th instar

Adult

Active Ingredient	Brown plant hopper LC_{90} (mg/L, ppm)				
	1st instar	3rd instar	5th instar 0DAM	5th instar 1-2DAM	Adult
Benzpyrimoxan	0.3～1	0.3～1	0.3～1	>3	>100
Buprofezin	0.3～1	0.3～1	0.3～1	>3	>100

DAM: Days After Molting

♪ **High nymphicidal activity since benzpyrimoxan acts on molting.**

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◆Insecticidal spectrum

Hemiptera species	Growth stage	Method	Activity*
Nilaparvata lugens	Nymph	Feeding	A
Sogatella furcifera	Nymph	Feeding	B
Laodelphax striatellus	Nymph	Feeding	B
Nephotettix cincticeps	Nymph	Feeding	C
Empoasca onukii	Nymph	Feeding	D
Stenotus rubrovittatus	Nymph	Feeding	D
Plautia crossota	Nymph	Feeding	E
Aphis gossypii	Nymph	Feeding	C
Bemisia tabaci / typeQ	Nymph	Feeding	D
Pseudaulacaspis pentagona	Nymph	Feeding	D

* Activity on nymph or larvae　A: Excellent, B: Very good, C: Good, D: Fair, E : Poor

♪ **Benzpyrimoxan showed high activity against three species of plant hopper in rice.**

♪ **Low impact on pollinator and beneficial arthropods**

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◆Molting in Untreated Control

◆Symptom by Benzpyrimoxan

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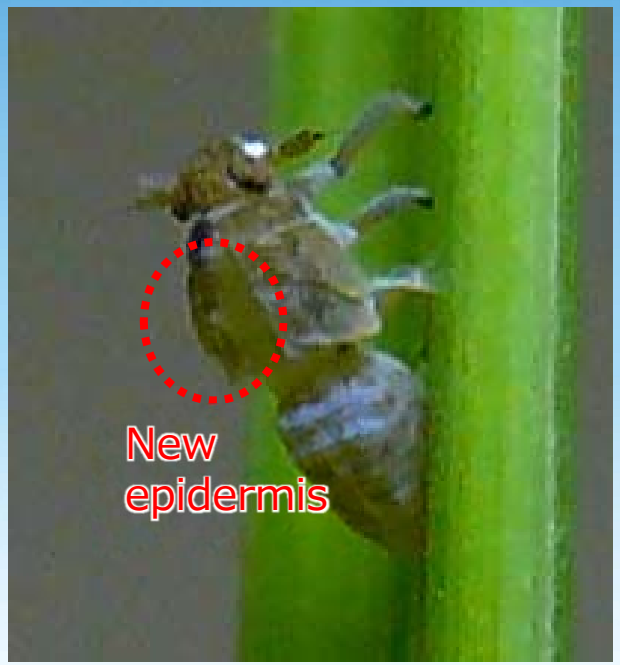
◆Comparison of Mode of Actions

Brown plant hopper 4th instar was inoculated on treated rice stem and observed at 5 days after treatment.

Benzpyrimoxan
50 mg/L



Buprofezin
50 mg/L

Untreated Control

♪ **The insecticidal symptom of Benzpyrimoxan was different from existing IGR product, Buprofezin.**

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◆Activity on resistant strain

Rice plant hopper 3rd instar	Population	Collected year	LC_{90} (mg/L, ppm)		
			Benz-pyrimoxan	Product A	Product B
Brown Plant Hopper	Resistant strain	2018	1-3	2-10	>100
	Susceptible strain	1983	0.3-1	0.08-0.4	0.16-0.8
	R/S		**3**	**25**	**>100**
Small Brown Plant Hopper	Resistant strain	2018	3	10-50	20-100
	Susceptible strain	1969	1-3	0.08-0.4	0.16-0.8
	R/S		**<3**	**>100**	**>100**

Test method : rice stem dipping

♪ **Benzpyrimoxan was highly effective on resistant strains without any cross-resistance.**

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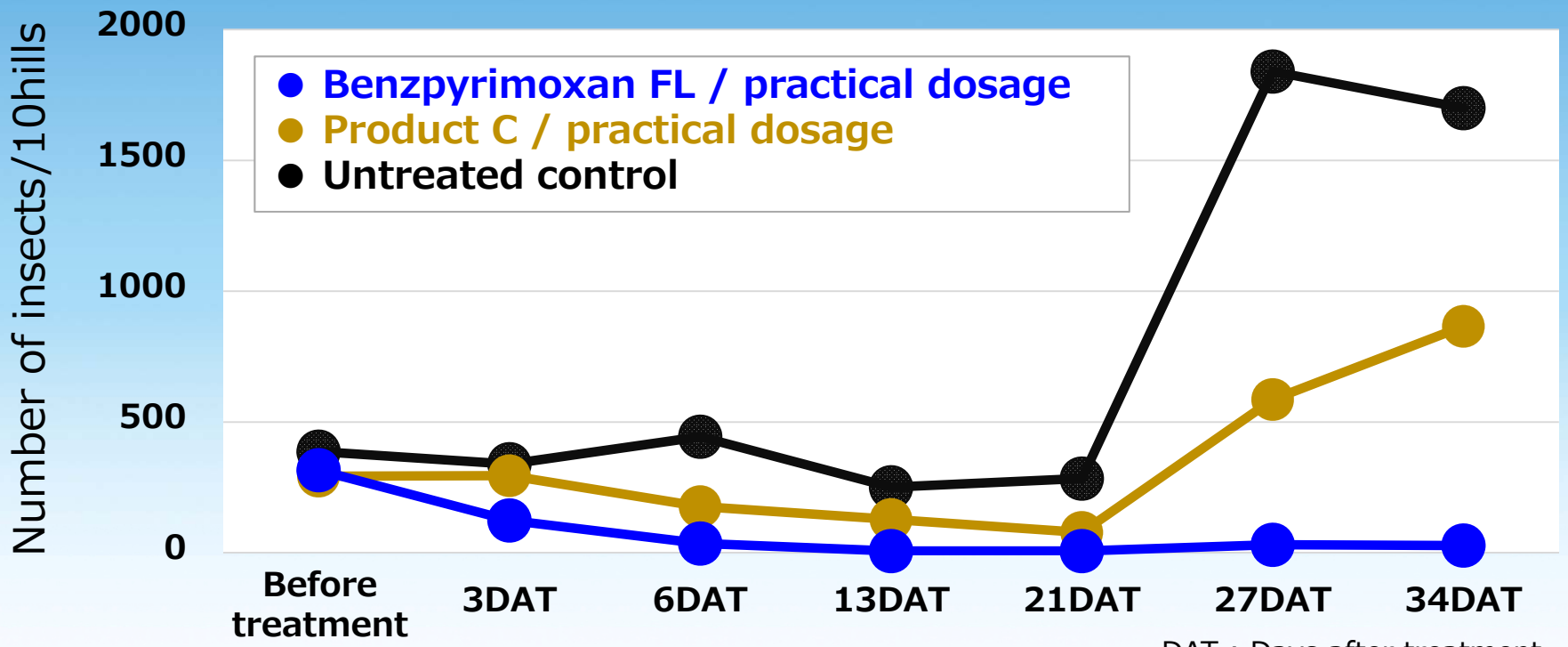
◆Control efficacy in the field

Official trial against Brown Plant Hopper in Japan, 2014.



DAT：Days after treatment

Sprayed by power sprayer with 1000L/ha. Count the number of hoppers on rice hills

♪ **Benzpyrimoxan showed excellent residual efficacy.**

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◆Toxicity on beneficial arthropods

Species	Growth stage	Test method	LD_{50}
Apis mellifera	Adult	Acute oral	>100μg a.i./bee
		Acute dermal	>100μg a.i./bee
Species	**Growth stage**	**Test method**	**LC_{50} (ppm)**
Bombyx mori	Larva	Feeding	>100
Phytoseiulus persimilis	Egg	Dipping & Feeding	>200
Neoseiulus californicus	Egg	Dipping & Feeding	>100
Pardosa pseudoannulata	Adult	Feeding	>100
Cyrtorhinus lividipennis	Nymph	Feeding	>200
Tytthus chunennsis	Nymph	Feeding	>100
Microvelia douglasi	Nymph	Dipping & Feeding	>100
Nilaparvata lugens	3rd instar	Feeding	0.12

♪ **Low impact on pollinator and beneficial arthropods.**

◆Toxicology

♪ **Nothing wrong with mammalian and aquatic toxicity.**

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Strategy of Product development

Market Development Division

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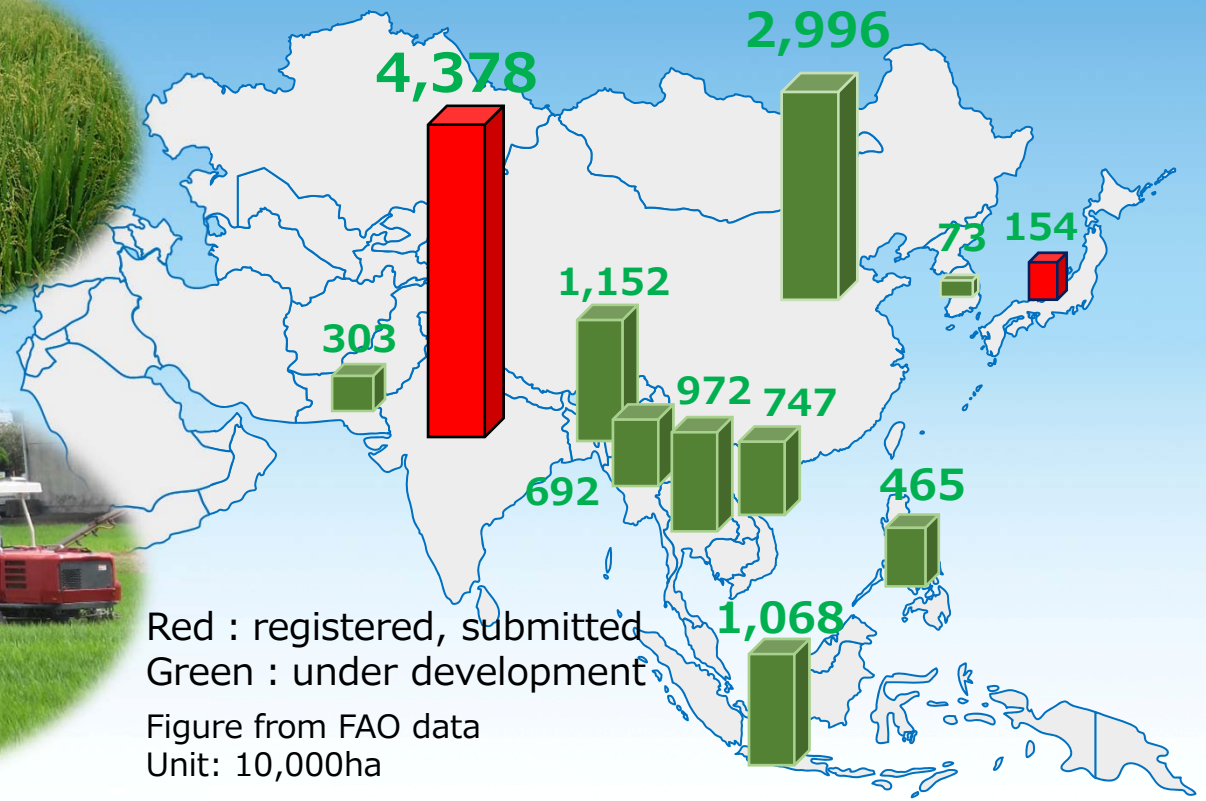
◆Rice cultivation area in Asia

Paddy rice harvest area（2019）



Red : registered, submitted
Green : under development

Figure from FAO data
Unit: 10,000ha

♪ Benzpyrimoxan is under develpment as the Plant Hopper insecticide in major paddy rice cropping countries.

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◆Development status of BPX by country

Countries	Company	Status
Japan	**Nihon Nohyaku Co.**	**Registered** (Launch)
India	**Nichino India Limited**	**Submitted**
Vietnam	**Nichino Vietnam Co.**	Under development
China	**Nichino Shanghai**	Under consideration
Indonesia, Thailand, etc.	Group companies or Distributor	Under development

♪ Benzpyrimoxan is developed as "Orchestra(R)" by group companies of Nihon Nohyaku in various Aisan countries.

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◆Tradename of BPX product

オーケストラ®

"Named from the harmony with various elements that support agricultural production such as environmental organisms, pest management technology, and cultivation technology in paddy fields"

Orchestra

Same trademark will be used in major countries such as India, Vietnam and Thailand

♪ We will build a brand image using unified trademarks throughout Asia

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◆Mark of Benzpyrimoxan

BPX
Benzpyrimoxan

♪ Used for product labels containing Benzpyrimoxan

We will contribute to the stable production of paddy rice in Asian countries, by developing Benzpyrimoxan, and we will build brand awareness of BPX and increase...

Promotion and sales plan in India

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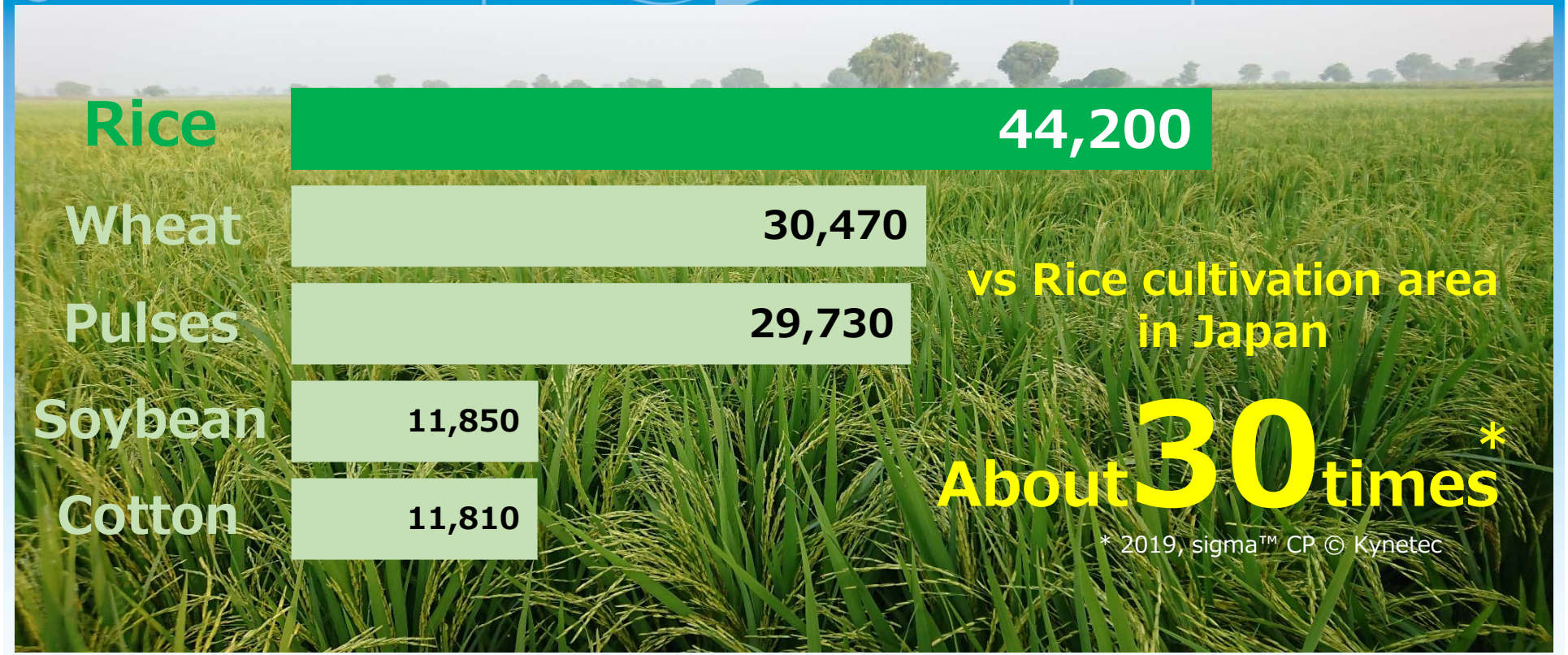
◆Crop cultivation area in India (Top 5, Unit: 000 ha)



♪ Rice is the most widely cultivated crop,

so larger agrochemical market is there.

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◆High performance by Orchestra® in India

- Many trials and tests were conducted by collaboration with Nichino India.
- Observed high performance of Orchestra® in major rice state/areas.
- Confidential laboratory test methods were shared with Nichino India, then details of performance were confirmed under Indian condition.
- High insecticidal activity was observed against local population with resistance for existing products.

♪ **BPX is excellent molecule in India also.**

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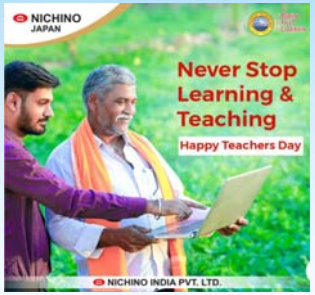
◆Promotion for customers

Dealer meeting

♪ Demo

Jeep campaign



Social media

Farmer meeting

♪ **Many approaches will be done for launching.**

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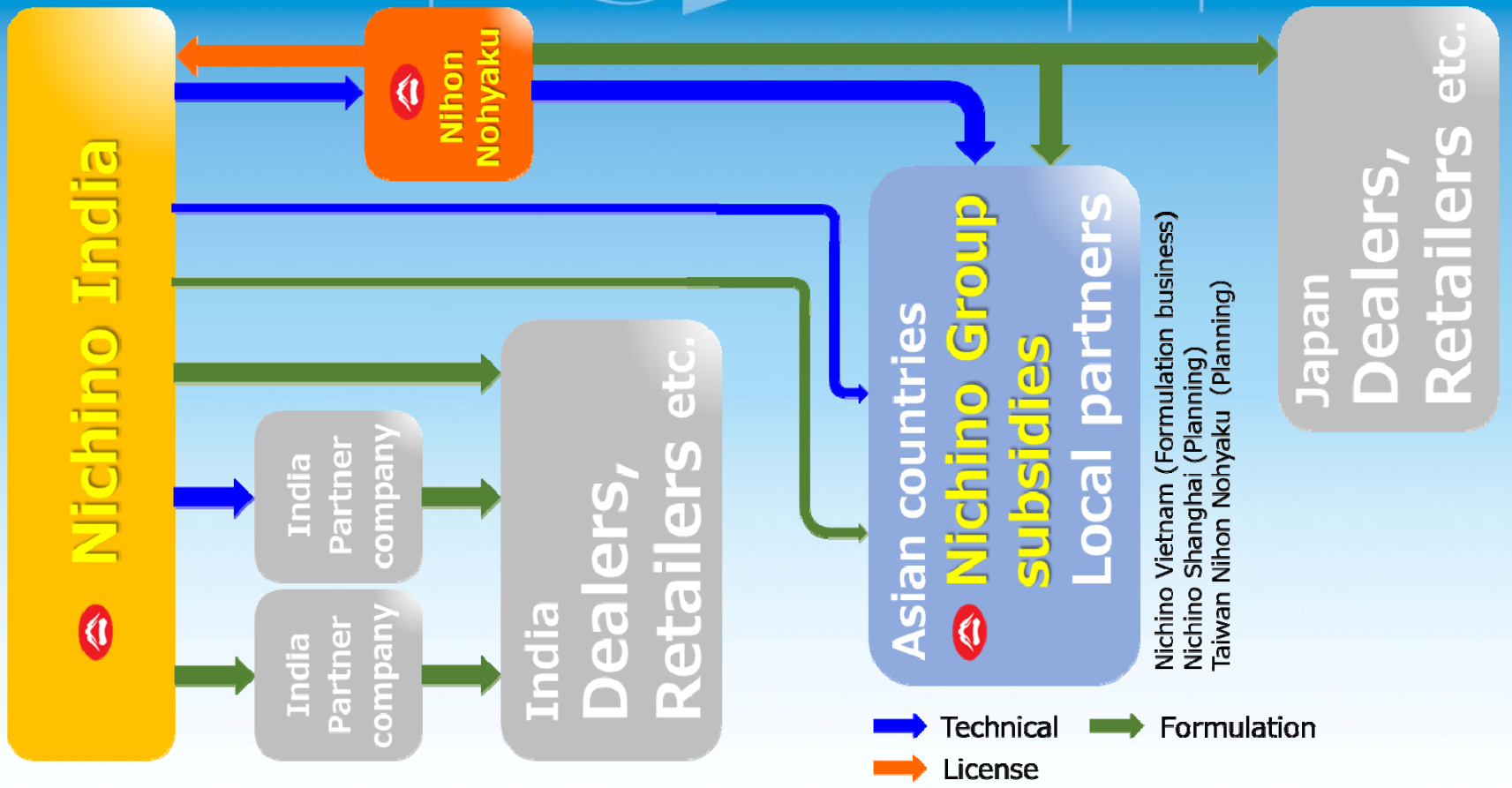
◆Nichino India as bushiness hub



♪ Maximize profits by expanding business of Nichino subsidiaries and utilizing our partners.

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◆Production base of BPX Technical

Nichino India Head Office (Hyderabad)

Certification

ISO 9001

ISO 14001

OHSAS 18001

(ISO 45001)

Nichino Chemical India

Humnabad factory (Humnabad)

♪ **New & Existing manufacturing plants contribute stable production and supply of BPX technical.**

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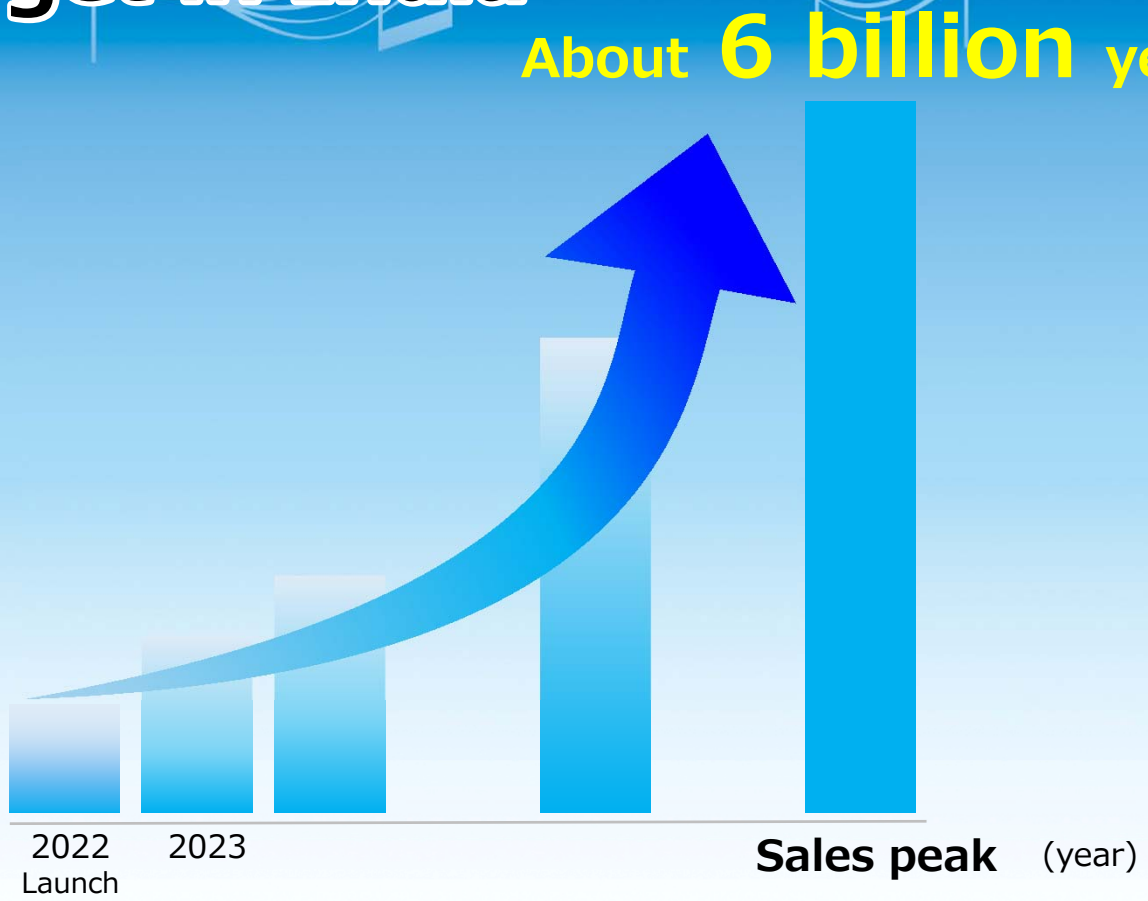
◆Sales target in India



♪ **Expecting 6 billion yen sales in India.**

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◆Japan to India, India to Asian countries

♪ Whole of Nichino group contributes rice production in India and other Asian countries.

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- ♪ Global sales target is more than 7 billion yen as a main product for rice planthoppers.
- ♪ Contribute to stable production of food in the world by controlling paddy planthoppers.
- ♪ A new active ingredient originally invented by Nihon Nohyaku, which is also effective against resistant planthopper.
- ♪ Excellent safety against environment, natural enemies and beneficial insects.

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Thank you for your kind attention

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