

Contribution to Global Food Security by the Japanese Seed Industry

September 25, 2012

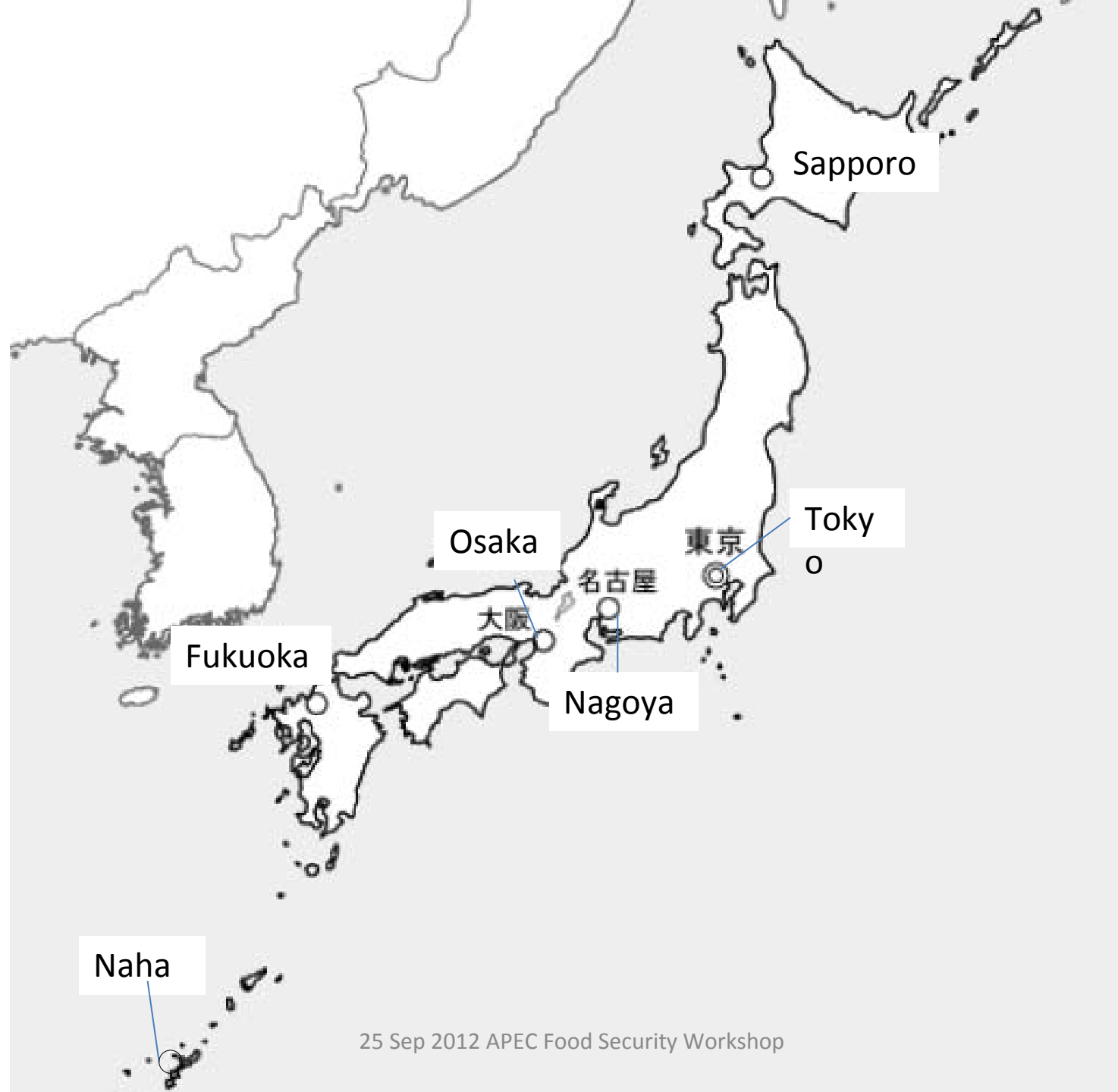
APEC Workshop on Food Security



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Agriculture, Forestry, Fisheries**



Diversity of Plant Varieties Developed in Japan I

- Target for improvement of rice varieties -

Higher yield

Cold tolerance

Disease resistance

Insect resistance

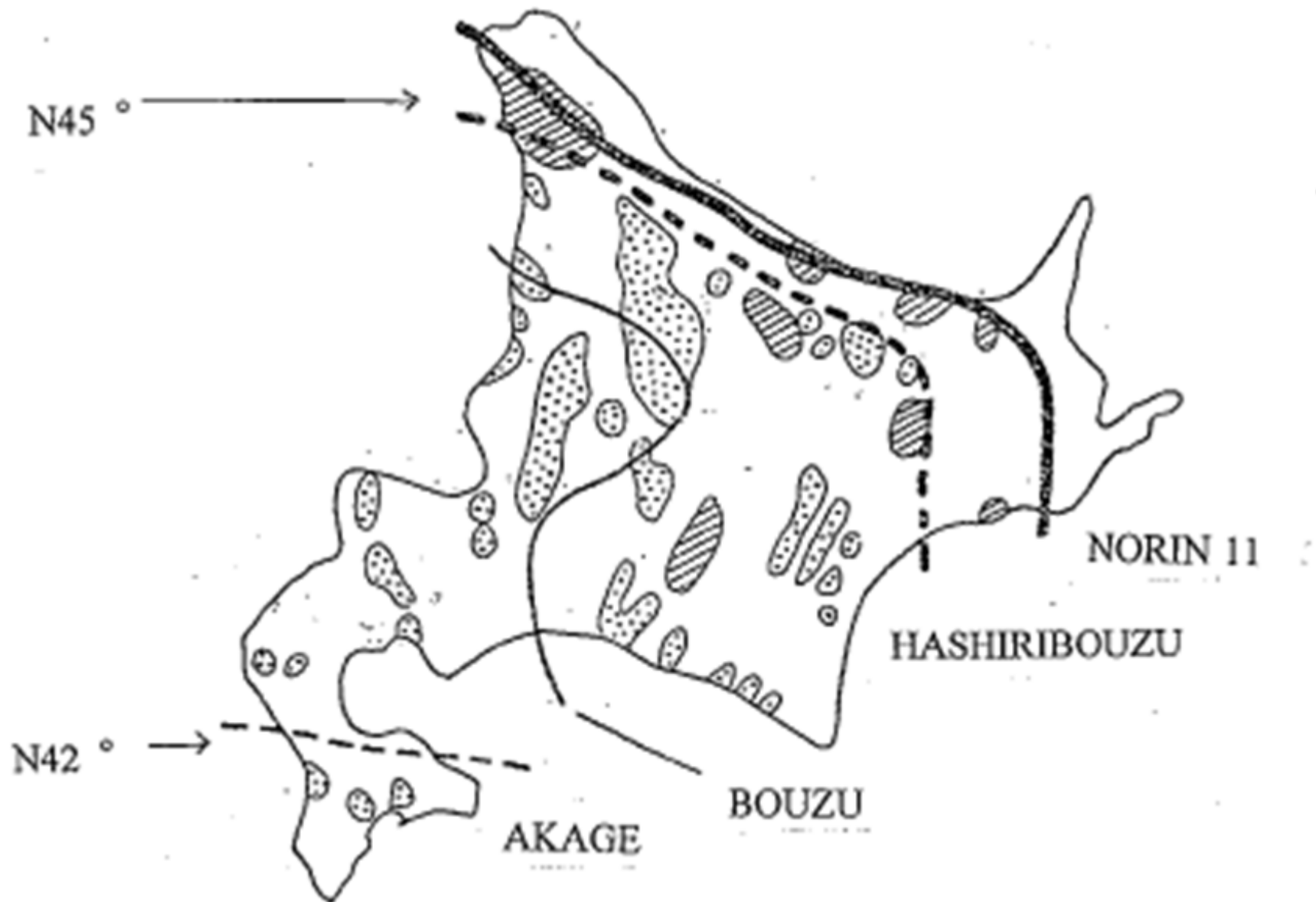
Nutrient tolerance

Resistance to lodging

Better adaptability to machinery

Better taste

Heat tolerance



Northern limit for rice cultivation has moved northward due to improved varieties

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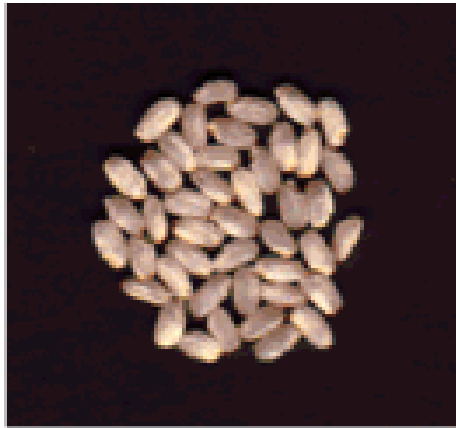
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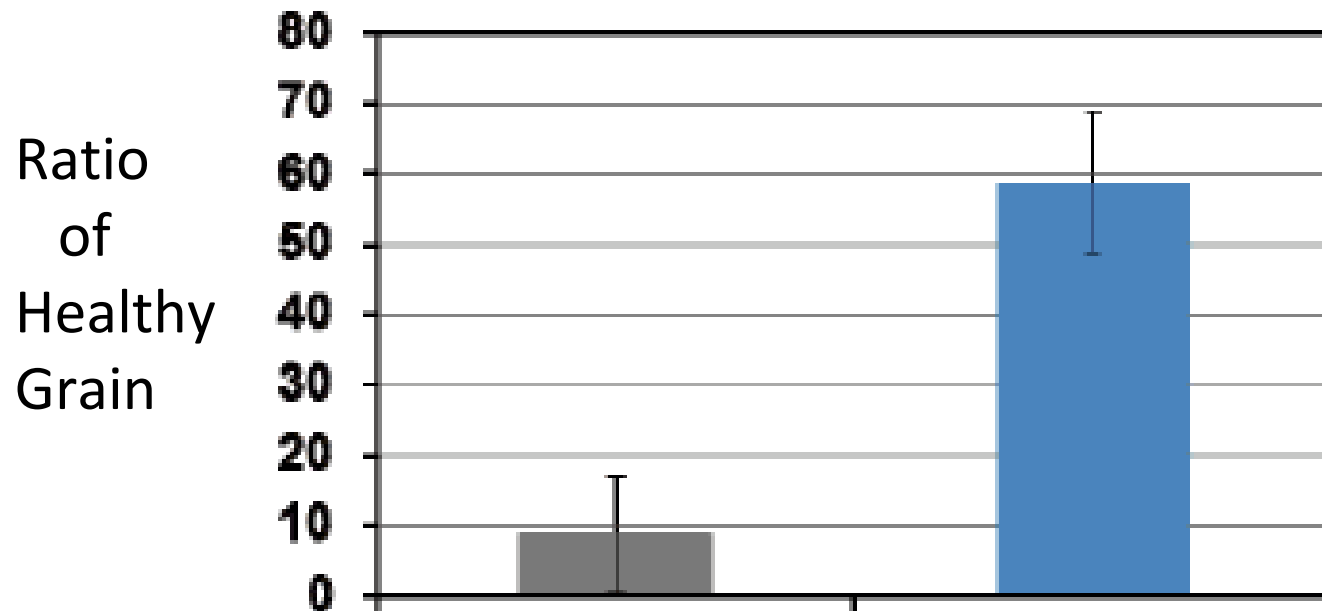
Heat tolerance



Control



Line with suppressed alpha –amilase



Japanese Traditional Vegetables

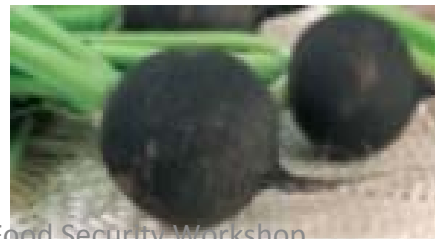
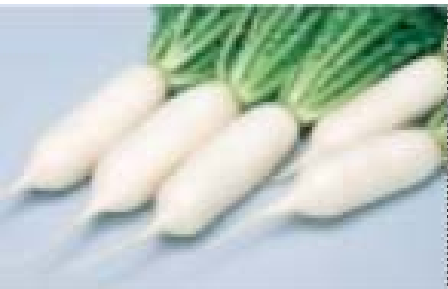


Various eggplants
(M.MORISHITA)

Number of Regional Vegetable Varieties (1980)

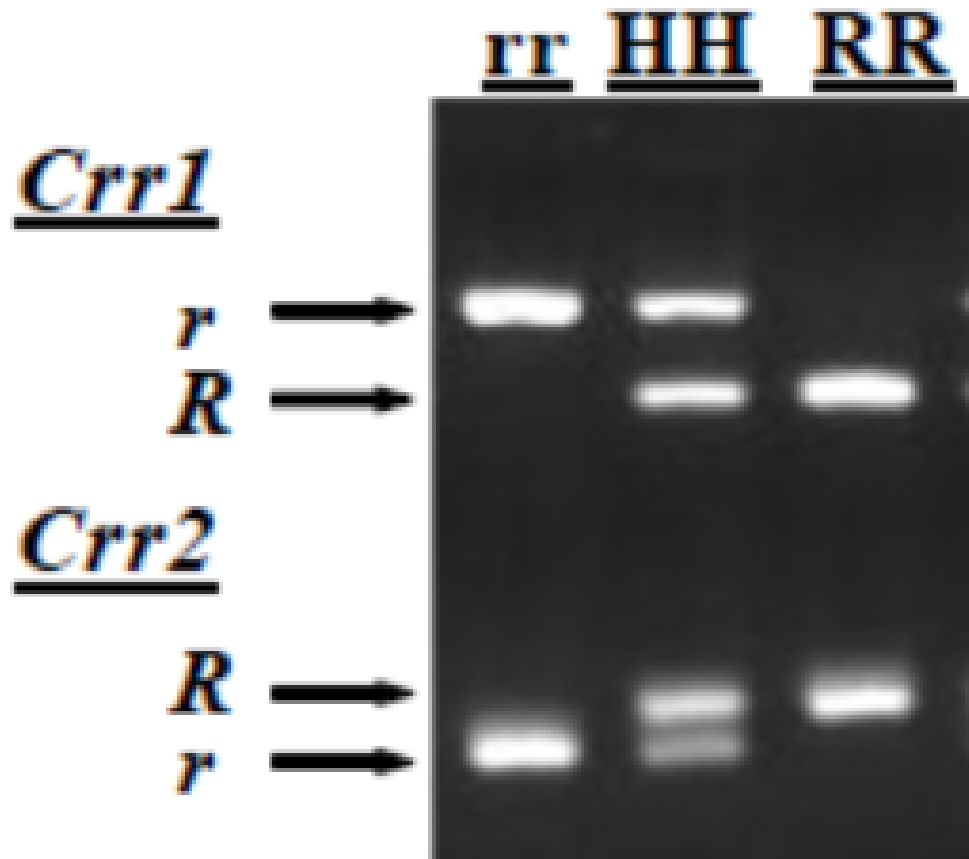
Vegetable	White radish	Tsuke na	Turnip	Green onion	Eggplan t	Cucum ber	Other vegeta ble (58)	total
Hokkai/Tohoku	14	17	18	16	10	10	134	219
Kanto/Tozan	31	21	14	23	9	14	154	266
Tokai	13	6	4	5	6	3	101	138
Hokuriku	5	12	7	7	13	6	48	98
Kinki	19	19	18	7	11	10	134	218
Chugoku	6	3	8	4	4	2	53	80
Shikoku	4	0	3	1	5	0	19	32
Kyushu/Okinawa	18	5	6	6	9	5	114	163
Total	110	83	78	69	67	50	757	1214

Various “Daikon” (White Radish)



Clubroot of Chinese Cabbage





Electrophoresis pattern of Marker Assisted Selection of clubroot-resistant gene



Clubroot-resistant Chinese cabbage

NORIN 10

- Wheat Variety which Saved the World from Hunger

Norin 10

High-yielding wheat variety developed in Iwate Prefecture in 1935.

Because it is short-stemmed, it can bear heavy ears without lodging.

Brought to USA by GHQ

Green Revolution

- ◆ Dr Borlaug of CIMMYT developed a wheat variety using Norin 10 as a parent.
- ◆ Seed production and shipment to India and Pakistan by CIMMYT

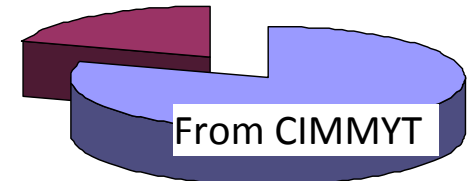
Food crisis was mitigated

Dr Norman Borlaug won the Nobel Peace Prize (1970)

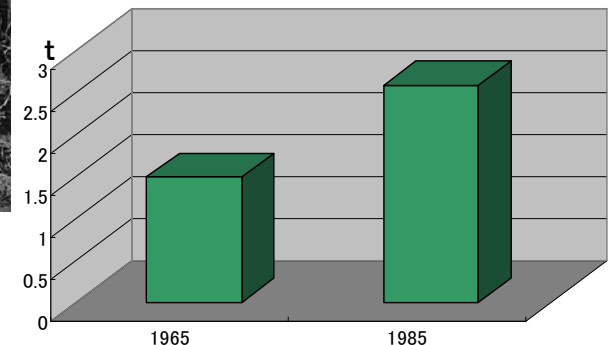


1960's

Today, 80% of wheat varieties used in the world are derived from CIMMYT (from Norin 10)



Wheat cultivation in developing countries: 9,700,000 ha



Yield of wheat increased from 1.5 t/ha to 2.6 t/ha in 20 years!

Impact of Breeding on Food Security

Promotion of breeding for new varieties to meet consumers' and farmers' needs

Quality of consumers' diet enhanced
⇒ improved nutritional value

→ Improved Food Security

Breeding is fundamental to improve food security

Agro-industrial Business

- example in Japan

New varieties developed by research institutes & local varieties



Sweet potato variety with enhanced anthocyanin

New Varieties



Promotion of agricultural production & local business



Cooperate with food industries

Developing New Market



Food & drink products using Anthocyanin

Contribution by Japanese Seed Industry

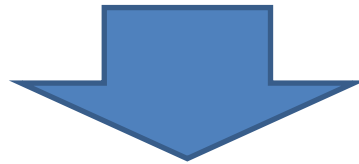
Comparative Strength of Japanese Seed Industry

Technology and know-how for;

1. Breeding
2. Quality Seed Production

Similarity in
agriculture with the
smaller APEC
economies

Cooperation with
national/ international
research institutes



**Sustainable breeding in
APEC Economies**

Breeding and Intellectual Property Rights are “Both Wheels of a Car”

Protection of intellectual property right on new plant variety is necessary to

1. Safeguard the right of breeder and farmer to maintain control over own or granted technology (variety)
2. Continue reinvesting in breeding
3. Play fair international competition in seed industry



Sustainable breeding and agriculture



Summary

1. Breeding is the key technology to achieve food security.
2. To sustain breeding activities, equally important is the protection of intellectual property rights of new plant varieties.
3. Japanese seed industry has gained great technology and know-how in its long history of breeding.
4. We are happy to share our experiences to support APEC Economies.