THE SUCCESS STORY OF "ST" AROMATIC RICE BREEDING IN VIETNAM AND THE IMPORTANCE OF PLANT VARIETY PROTECTION

This presentation explores Vietnam's journey in fragrant rice development, from its humble beginnings to its transformative impact on the rice industry, focusing on the ST25 rice variety.

WE ARE SEED & RICE PRODUCER FROM SOC TRANG PROVINCE, VIETNAM

HO QUANG CUA

Represent the research group of ST rice varieties

TRAN QUANG VU

Head of Strategy and International Markets

OUR JOURNEY OF FRAGRANCE RICE BREEDING FROM 1990 - 2014

THROUGHOUT HISTORY, VARIOUS TYPES OF FRAGRANT RICE HAVE BEEN WELL DOCUMENTED AND FAMOUS ALL OVER VIETNAM .

N

18TH CENTURY - NORTH OF VIETNAM

Tám Xoan Hải Hậu, a fragrant rice variety with Japonica subspecies, was reserved for royalty.

C

19TH CENTURY - CENTRAL OF VIETNAM

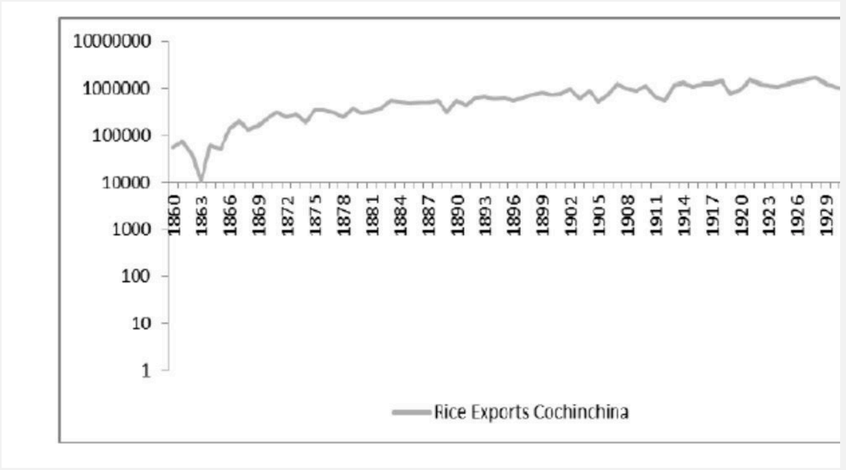
Ngự Glutinous rice and De An Cựu fragrant rice were supplied to the King's Palace.

S

LATE 19TH CENTURY - SOUTH OF VIETNAM

Nàng Thơm Chợ Đào was exported to France at premium prices.

COLONIAL ERA: WARS, RICE EXPORT, FAMINE & DESTRUCTIONS



FRENCH COLONIZATION 1887 - 1954

Rice production and export soared under French rule, **exceeding 1 million tons annually**. However, this export-driven focus came at a cost. French colonial policies prioritized maximizing rice production for export, neglecting domestic needs.

WORLD WAR II

The 1944-1945 famine claimed the lives of 2 million Vietnamese. World War II turned Vietnam into a battleground, disrupting agriculture and causing widespread food shortages.

THE VIETNAM WAR (1955 - 1975)

The Vietnam War, a period of intense conflict, **further disrupted rice production and compounded existing food insecurity issues**. The war's prolonged nature had a devastating impact on agriculture, exacerbating food shortages and pushing the Vietnamese people further into hardship.

30 APRIL 1975: VIETNAM GAINED INDEPENDENCE

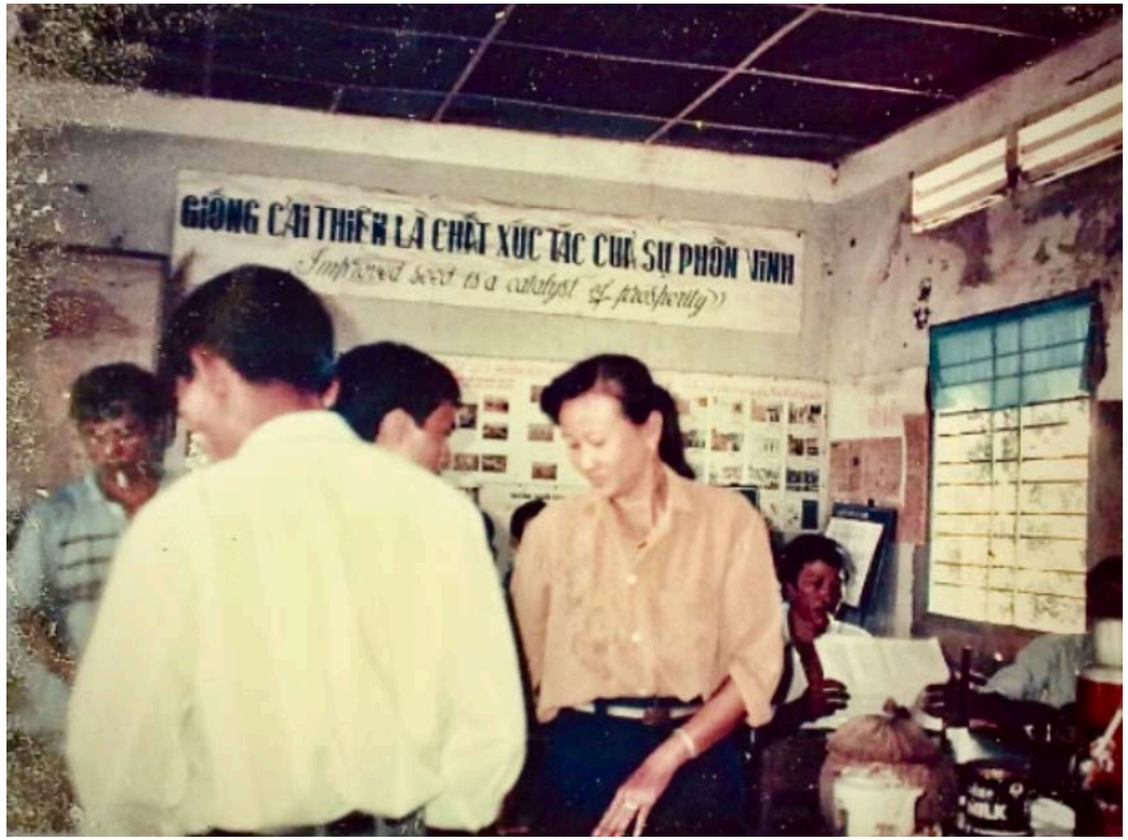
PRIORITIZING FOOD SECURITY

- Despite gaining independence, the country faced significant **FOOD SHORTAGE for the next 10 years.**
- During this period, **Vietnam imported 1.5 million tons of food annually**, including rice, wheat, and other staples
- Between 80s and 90s, **Vietnam conducted extensive research and collected local rice varieties from across the country. Studies revealed that Vietnam possesses a remarkably rich diversity of rice varieties compared to other Southeast Asian nations**.
- Until 2001, rice farms were restricted to growing only rice.
- By 1989, Vietnam starts to export rice again but were perceived as low quality exporter.

MISSED OPPORTUNITIES

- Due to the singular focus on food security and maximizing yield and volume, **VIETNAM'S RICH RICE DIVERSITY REMAINED LARGELY UNTAPPED**.
- Despite being a leading rice exporter for decades, **RICE FARMERS CONTINUED TO STRUGGLE WITH THEIR LIVELIHOODS.**

SETTING THE MISSION



1990

"IMPROVED SEED IS A CATALYST OF PROSPERITY"

TODAY

Our Mission remains at the Gate of our Research Center and Factory

RESEARCH ON LOCAL & INTERNATIONAL VARIETIES

RESEARCH ON LOCAL FRAGRANT RICE

We delved into Vietnam's rich rice archives, meticulously documenting the diverse fragrant rice varieties found across the country, **especially Nang Thom Cho Dao from South (Mekong Delta) and Tam Thom from the North (Red River Delta)**

RESEARCH ON INTERNATIONAL VARIETIES

Alongside studying local varieties, we also **tested and evaluated fragrant rice from IRRI, Japan, Taiwan, China, Thailand, and Cambodia.**

RIGOROUS TRIALS

Through extensive field trials, **we systematically assessed the quality, yield, and aroma profiles of each rice variety** to identify the most promising candidates.

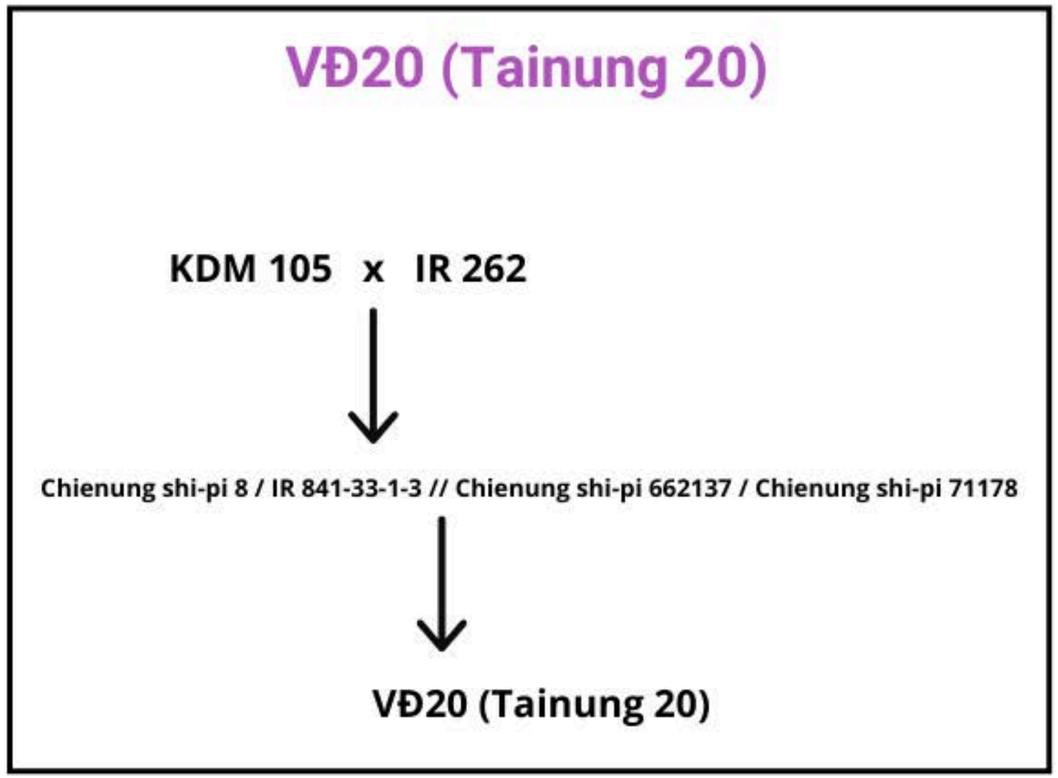
SETTING THE AMBITION

Research and Development in finding new high quality fragrant rice is a green field in Vietnam.

Based on research papers and research programs in Vietnam, **analysis of local rice varieties including improved varieties shows that there are no local variety that have high quality standard like Thai Hom Mali rice.**

Base on our years of research in the field, we concluded:

- **WE WILL USE KDM 105 QUALITIES AS A BENCHMARK FOR OUR NEW VARIETIES.**
- With thousand of years history and tradition of Delicious Rice, **VIETNAMESE PEOPLE WILL DEFINITELY SUPPORT IMPROVED VARIETIES THAT EXCEED THESE BENCHMARKS.**



RESEARCH ON VD20 VARIETY

One of the variety we were researching on was **Tainung 20 (VD20)**, a variety that were invested in Vietnam by Taiwanese companies.

VD20 is a result of the cross between **AROMATIC INDICA VARIETY IR841-33-1-3** with **3 IMPROVED FRAGRANT JAPONICA RICE WITH SHORT AND SMALL GRAIN FROM TAIWAN.**

Mr. Cua and ST3 research field

THE DISCOVERY OF ST 3

Our research continued in the fields, and between **1997 and 2000**, we made a groundbreaking discovery. **On VD20 research farms**, we found **naturally mutated lines with a unique aroma and long grain.**

Mr. Cua and the research team collected thousands of these individuals and **continued to select them in subsequent crops. Ultimately, they released a new rice variety and named "ST3".**

The ST3 variety has a UNIQUE AROMA that we believe SURPASSES THAT OF THAI HOM MALI. This realization reinforced the benefits of DISTANT HYBRIDIZATION.

This discovery marked an important milestone in our research journey and shaped our future methodology in the search for better varieties.

Dr. Le Xuan Tham and experts from IAEA (International Atomic Energy Agency) visit our research center (08/2007)

2002 COLLABORATION WITH DALAT NUCLEAR RESEARCH CENTER

Our researchers obtained **Cobalt-60 irradiated rice for subsequent evaluation and breeding**.

These irradiated lines are: **Hà Giang Purple Glutinous Rice, Red ST3 and multiple Tam Xoan Hai Hau from North of Vietnam.**

The mutated ST3 by Gamma Cobalt 60 irradiation helped eliminating photosensitivity, allowing two crops per year and doubling productivity.

Mutagenic screening and selection of promising variants were conducted during the 2003 - 2004 period to **create hybriding materials.**

2004 - INITIATED COMPLEX HYBRIDIZATION EXPERIMENTS

We initiated **5 COMPLEX HYBRIDIZATION EXPERIMENTS USING A POOL OF 4 TO 7 PARENT VARIETIES.**

These varieties were sourced from our existing gene bank, previous breeding programs, and newly acquired materials from the Da Lat Nuclear Research Institute.

2008 - THE SUCCESSFUL RELEASE OF ST19 AND ST20

ADDITIONAL HYBRIDIZATION EXPERIMENTS WERE INITIATED TO ADDRESS THE QUALITY DEFICIENCIES OF ST 19 AND ST 20, PARTICULARLY THE LOWER GEL CONSISTENCY (<65MM) COMPARED TO THE BENCHMARK VARIETY KDM 105 (80MM).

2014 - SUCCESSFUL DEVELOPMENT AND RELEASE OF ST21, ST22, ST24 AND ST25 **WHICH OUTPERFORMED THE BENCHMARK VARIETY KDM 105.**

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
ĐỘC LẬP - TỰ DO - HẠNH PHÚC

BẰNG BẢO HỘ GIỐNG CÂY TRỒNG

SỐ BẰNG: 26.VN.2018

TÊN GIỐNG CÂY TRỒNG: ST24
THUỘC LOÀI: LÚA - *Oryza sativa* L.
CHỦ SỞ HỮU: DOANH NGHIỆP TƯ NHÂN HỒ QUANG TRÍ
TÁC GIẢ GIỐNG CÂY TRỒNG: Tác giả chính: Trần Tấn Phương
và đồng tác giả: Hồ Quang Cua, Nguyễn Thị Thu Hương
THỜI HẠN BẢO HỘ: 20 năm

Hà Nội, ngày 02 tháng 04 năm 2018
KT. Cục trưởng Cục Trồng trọt
PHÓ CỤC TRƯỞNG
Trần Xuân Linh

Cấp mới ☐ QĐ số: 32/QĐ-TT-VPBH
Cấp lại ☐ QĐ số:

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
ĐỘC LẬP - TỰ DO - HẠNH PHÚC

BẰNG BẢO HỘ GIỐNG CÂY TRỒNG

SỐ BẰNG: 21.VN.2020

TÊN GIỐNG CÂY TRỒNG: ST25
THUỘC LOÀI: LÚA - *Oryza sativa* L.
CHỦ SỞ HỮU: DOANH NGHIỆP TƯ NHÂN HỒ QUANG TRÍ
TÁC GIẢ GIỐNG CÂY TRỒNG: Hồ Quang Cua và đồng tác giả: Trần Tấn Phương, Nguyễn Thị Thu Hương
THỜI HẠN BẢO HỘ: 20 năm

Hà Nội, ngày 06 tháng 4 năm 2020
Cục trưởng Cục Trồng trọt
CỤC TRỒNG TRỌT
Nguyễn Thị Lương

Cấp mới ☐ QĐ số: 45 /QĐ-TT-VPBH ngày 06/3/2020
Cấp lại ☐ QĐ số:

ST24 and ST25 Plant Protection Certificate (20 years)

NATIONAL EVALUATION AND PVP

2014 - 2017: NATIONAL EVALUATION PROCESS AND CVU (VALUE OF CULTIVATION AND USE) EVALUATION.

The national evaluation process for these new rice varieties was initiated in 2014 and concluded in 2017. Following successful completion of the CVU evaluation, the Department of Crop Production issued protection certificates for ST24 and ST25.

2019: NATIONAL RECOGNITION

The Ministry of Agriculture and Rural Development of Vietnam granted national recognition to both ST24 and ST25 rice varieties.

WE ARE THE FIRST AND ONLY PRIVATE COMPANY FROM VIETNAM TO HAVE WON "THE WORLD'S BEST RICE" AWARDS TWICE WITH OUR PROPRIETARY VARIETIES.

2017 - 2018 — ST 24 RANKS AMONG THE TOP 3 WORLD'S BEST RICE VARIETIES.

2019 — ST 25 RICE WINS "WORLD'S BEST RICE" FOR THE FIRST TIME.

2020 - 2022 — ST 24 & ST 25 CONSISTENTLY RANKS AMONG THE TOP 4 WORLD'S BEST RICE VARIETIES.

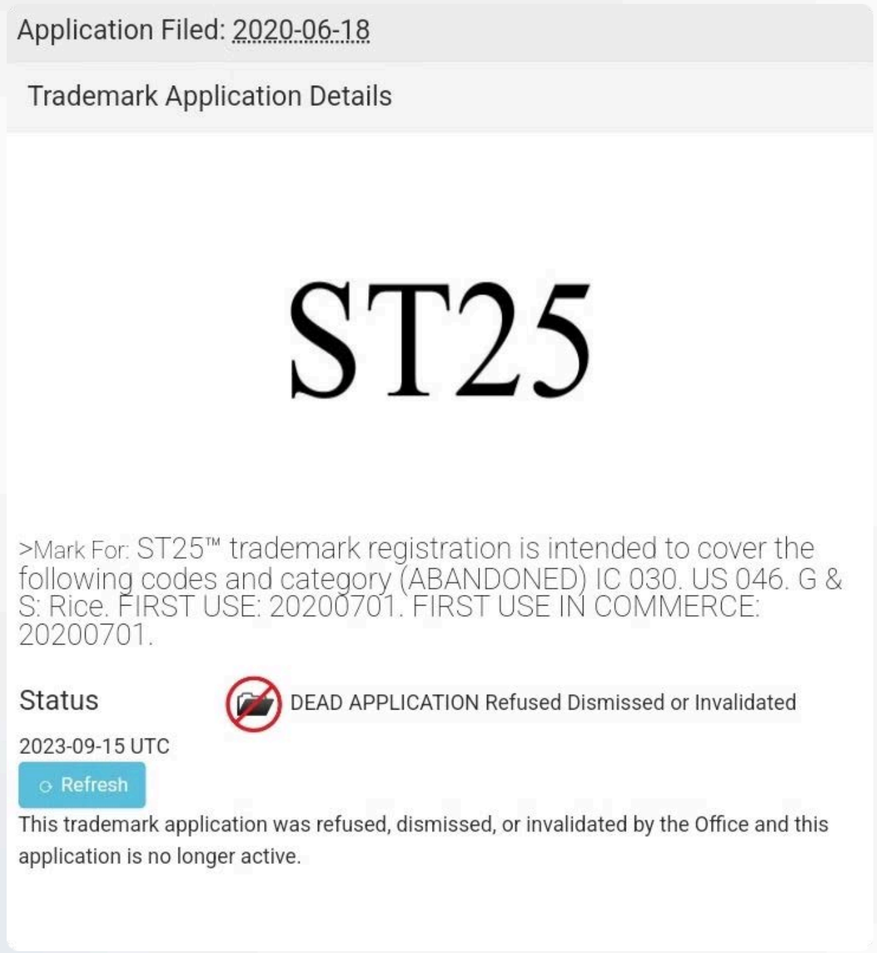
2023 — ST 25 WINS "WORLD'S BEST RICE" FOR THE SECOND TIME, SOLIDIFYING VIETNAM'S LEADERSHIP.

IIMPACT OF IMPROVED RICE VARIETIES: TRANSFORMING LIVES, PROMOTING SUSTAINABILITY & BUILDING BRAND

- Over a 15-year period (2002 - 2017) , farmers saw a **COMBINED PROFIT INCREASE OF OVER $400 MILLION FROM CULTIVATING ST3 AND ST5 RICE VARIETIES.**
- **Up to 200,000 hectares of ST25 are being cultivated in the Mekong Delta region alone.**
- **Farmers income increased up to 50%** in main season comparing vs. other soft texture varieties thanks to **higher yield**, **disease resistant and high market demand**.
- Transforming **Vietnamese rice brand** from low-quality to **high quality with premium export price**.
- Vietnam’s unique **Rice-Shrimp rotation crops promote sustainability** with farmer’s flush out salinity before planting to protecting soil fertility, preventing salinization.
  Farmers are adopting Alternate Wetting & Drying (AWD) method which **reduces methane emissions** as well as **improving productivity and rice quality.**

IMPACT OF PLANT VARIETY PROTECTION

- Build breeder’s confidence, result in investments in R&D to develop new varieties or improving existing varieties.
- Guarantee that farmers gain access to improved varieties, authentic seeds with high-quality. Impacting their livelihood.
- Promote new brand & access to new markets.



VIETNAM NEEDS STRONGER IP ENFORCEMENTS

- **More than 30 applications, from various companies around the world tried to register "ST25" or "ST 25 The World's Best Rice" as a Trademark**.
- **Counterfeits rice products** flooded the market, trying to profit from unethical trade.
- **Counterfeiters are selling fake seeds, either renaming “ST25” or selling saved grain to farmers leading to low yields and reduced farmers income. The current IP enforcement framework is too lenient to serve as an effective deterrent against infringements especially in Seed IP Infringement.**
- One example that we can learn from is how Thailand introduced the Thai Rice Standards for Export and use DNA technology to identify purity and authenticity of rice products to protect the national rice brand Hom Mali of Thailand.

THANK YOU!