



HISTORY OF MYANMAR PAW SAN HMWE

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Abstract

Paw San Hmwe (PSH) is known as “Pearl Rice”. It is an indigenous rice variety from Myanmar with a good taste, strong aroma, and excellent elongation ability during cooking. The objective of this study is to investigate the true origin, geographical distribution, and specific traits of Paw San Hmwe using historical records, literature sources, and physiological properties. It was also intended to make the public widely known. Findings suggest that the Ayeyarwady Delta region played a significant role in the early cultivation of Paw San Hmwe. Myaungmya Agricultural Research Farm is the true origin, selection, and produce of this variety. The breeding line number of Paw San Hmwe is (D-44-8) and was produced by pure line selection. Later, it expanded into other suitable ecological zones because of high market demand and superior grain quality. Understanding this variety's historical origin and distribution helps preserve Myanmar's indigenous rice heritage and supports future conservation and breeding programs.

Keywords: Paw San Hmwe (PSH), Indigenous Rice Variety, Ayeyarwady Delta, Geographical Distribution, Pure Line Selection

Introduction

Rice (*Oryza sativa* L.) is one of the most preferred staple cereal crops in Myanmar; the rice sown area is 7.18 million hectares, and the national average yield is 4.25 metric tons per hectare (MOALI, 2024). Myanmar is one of the centers of genetic diversity of rice, and the varietal group that spreads along the Himalayas from Iran to Myanmar consists of very diverse varieties (Glaszmann, 1986). The areas including Assam in India, Myanmar, Laos and Yunnan in China could provide the richest spectrum of varietal diversity (Chang, 1976).

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History of Myanmar Paw San Hmwe

Myanmar local rice varieties were standardized by Mr. R. A. Beale in 1927 as Emata (A type), Letywezin (B type), Ngasein (C type), Meedon (D type) and Byat (E type) to facilitate external and internal trade, and this classification was based on the dimensions of grain (Kyaw Myint, 1999). Myanmar rice can be classified into five groups, namely Emta, Let YweZin, NgaSein, Byat, and Meedon. Paw San rice is included in the Meedon group and is the most popular, widely cultivated quality rice due to its superior quality and strong demand. Paw San Hmwe has traditionally been grown in the rain-fed lowland areas of Ayeyarwady Region in Myanmar. It is well adapted to the particular local environmental conditions, especially in the delta region of Myanmar (IFPRI, 2022).

Paw San Hmwe or Pearl Paw San is famous in the international market because of its strong aroma, good cooking quality, and substantial grain elongation during cooking (Thein, 2011). In 2011, PSM was awarded the ‘World Best Rice 2011’ at The Rice Trader’s “3rd World Rice Conference 2011” held in Ho Chi Minh City and the World’s Best Rice Award 2026 at the International World Rice Conference held in Manila, the Philippines, and is a market-driven export rice. Rice is not only a principal food but also a main exported cereal for Myanmar (Win et al., 2024). Paw San rice varieties are popular for their high quality and are prevalent among Myanmar's actively cultivated rice. Historical records indicate that the origin of Paw San Hmwe is the Ayeyarwady Delta. However, their detail origins have been approved as Myaungmya Agricultural Research Farm (Former), presently called Regional Research Center (Myaungmya).

Mr. R. A. Beale measured the length and breadth of rice grains and paddy, and classified them into groups based on their grain size and shape. This classification system, known as Beale’s Classification, is still in use today (Aye Chit, Khin Htay Oo & Hla Win, 2018). There are different types of rice: wild, weedy, landrace, local, traditional, and improved forms in Myanmar.

Local varieties of Meedon group rice were collected from different locations before the 1980s. It was maintained at Rice Division of Agriculture Research Institute (presently Department of Agricultural Research), Yezin, Pyinmana and at Hmawbi Seed Farm (presently Myanmar Rice Research Center) in Yangon Region by a procedure of annual regeneration. Then, the Myanmar Seed Bank, in collaboration with JICA of the Japanese government, was established in 1990, and crop genetic resources, including rice germplasm along with Meedon rice germplasm from different institutions, were transferred to the Seed Bank for long-term conservation (Thein, 2011).

Paw San rice varieties express regional variations in classification as well as differences in physical quality, texture, and other characteristics. They are cultivated under various variety names and local designations. Additionally, Paw San rice varieties have diverse names based on the rice market and the growing region.

Origin of Paw San Hmwe

In Myanmar, a wide variety of rice cultivars are cultivated according to regional preferences. Local rice varieties were mostly grown in the past. These varieties had been cultivated over prolonged periods across different regions, naturally resulting in the emergence of numerous names.

It has been found that even a single genetically identical variety is referred to by various names and cultivated according to local regional practices (Thet, 2018).

In 1926, Myaungmya Agricultural Garden Center was established and opened. Then, they carried out research, breeding, and selection work. It was conducted using the indigenous selection method for local adaptation. In this process, Paw San rice selections were made based on the rice variety group classification system, incorporating year numbers and plant numbers (breeding numbers) to entitle variety names.

Breeding Line Number	Rice Variety Name	Selected Regions	Selected		Varieties Group Type
			Year	Plant Number	
A-28-6	Pin To Kalay	Myaungmya	1928	9	Emata
A-29-20	Pin To Sein	Hmawbi	1929	20	Emata
A-35-17	Ei Kayin Kya	Mudon	1935	19	Emata
B-24-92	Maung Nyo	Hmawbi	1924	92	Letywezin
B-38-35	Hnan Kar Tun	Myaungmya	1938	35	Letywezin
B-40-4	Shwe Bo Kyun Ni	Mandalay	1940	4	Letywezin
C-15-10	Hmawbi Nga Sein	Hmawbi	1915	10	Ngasein
C-24-71	Shan Nyein	Hmawbi	1924	71	Ngasein
C-46-4	Nga Kyauk Phyu	Sittwe	1946	4	Ngasein
D-40-2	Kayhan Kyar	Mandalay	1940	8	Meedon
D-44-8	Paw San Hmwe	Myaungmya	1944	8	Meedon
D-60-8	Paw San Bay Kyar	Myaungmya	1960	2	Meedon
E-30-42	Law Thaw Gyi	Mudon	1930	42	Byat
E-43-43	TheeHtat	Mudon	1943	43	Byat
E-43-53	Sein Gyi	Mudon	1943	53	Byat

A= Emata , B =Letywezin , C =Ngasein , D =Meedon and E=Byat Source (Chit et al., 2018)

According to the above evidence table, it can be strongly stated that the origin of the Paw San Hmwe rice varieties is the Regional Research Center (Myaungmya). The breeding line number of Paw San Hmwe is (D-44-8) and Paw San Bay Kyar is (D-60-8). It was produced by pure line selection.

Distribution history of Paw San Hmwe

Farmer U Thant Gyi was brought Paw San Bay Kyar rice (8 kg) from Bong Lon village, Kyauktan Township, Yangon Region in 1997-1998. Later, initial trials were carried out on his farmland in Thi Lon village, Shwebo Township. Paw San Bay Kyar is suitable for Shwebo's local

weather and soil, with high yield, good grain quality, and excellent eating properties due to its locally adaptable superior characteristics. Moreover, it expanded in popularity for use in religious and social events, sparking interest among local farmers who exchanged seeds among themselves, leading to wider cultivation in 2000-2001 (Aye Chit, Khin Htay Oo & Hla Win, 2018).

In 2002-03, farmers began selling to the Moe Koet area, while rice traders in Shwebo Township started buying, signaling the emergence of a market. In 2004-05, Chi Pa seed farm requested the Department of Agricultural Research (DAR) to support the (Register Seed) level of Paw San Bay Kyar with about 60 baskets in Shwebo Township for seed multiplication. Later, they were alongside efforts with benefit-sharing farmers in Thi Lon village (Aye Chit, Khin Htay Oo & Hla Win, 2018).

Seed production was insufficient in 2005-2006; Shwebo farmers' officials requested 150 baskets of Paw San Bay Kyar rice from Thay Yarng Chaung pure seed farm in Pathein Township, Ayeyarwaddy Region. They also brought in 15 baskets of Paw San Yin from Auk Kyaing Gyi farm in Phayapon Township. These seeds supported continued seed multiplication with benefit-sharing farmers at Shwebo. In 2006-2007, Chi Pa seed farm brought Paw San rice seed from DAR and annually produced superior Paw San pure seed for distribution (Aye Chit, Khin Htay Oo & Hla Win, 2018).

Paw San Bay Kyar rice started in Thi Lon village, Shwebo Township. It spread through farmer-to-farmer seed exchange. Chi Pa farm also distributed seeds. It expanded beyond Shwebo to other townships. It became a top pure superior strain in the market. By 2006-07, it reached the Mandalay market as Shwebo Paw San rice. After Cyclone Nargis in 2008, Yangon consumers preferred its qualities. This gave it stronger market access.

Among the Paw San Hmwe types, Paw San Bay Kyar, Paw San Hmwe, and Paw San Yin are the most widely populated. Shwebo Paw San is derived from the Paw San Bay Kyar type. Paw San Bay Kyar has a relatively higher head rice recovery, whereas Paw San Hmwe has a slightly lower rice recovery percentage compared to Paw San Bay Kyar (Thein, 2018).

In the Ayeyarwady Region, Paw San rice varieties exhibit very similar plant morphology, including panicle type, panicle branching pattern, and grain arrangement. Their vegetative characteristics and grain size are also largely comparable. However, differences exist in flowering time, maturity duration, grain color, and the presence or absence of awns (Swe., 2018).

Among the 19 identified Paw San varieties, nine are seasonal (photoperiod-sensitive) varieties, while ten are duration-type varieties. Within the Paw San Gyi group, nine seasonal varieties have been identified, including three with yellow-colored grains and six with brown-striped grains. In the Paw San Yin group, three varieties have yellow grains, while seven varieties possess brown-striped grains (Myint Yi et al., 2018).

Regionally distinct Paw San varieties include Kangyidaunt (Paw San Gyi), Tharoung Chaung Kwin (Paw San Hmwe), and Nyaungdon (Taung Pyant Wa), which have yellow-colored grains. Among these, Nyaungdon (Taung Pyant Wa) is unique because it possesses awns on the grains. These three varieties exhibit distinct morphological characteristics. In addition, Wakema

Paw San Gyi-1 and Paw San Gyi-2 belong to the Paw San Gyi group and are classified as seasonal Paw San Bay Kyar–type varieties (Thein, 2011).

In the Yangon Region, the Paw San rice cultivated belongs to the Mee Done group of rice varieties. These are commonly grown under several local names, including Paw San Hmwe, Paw San Yin, Bay Kyar Lay, Paw San Bay Kyar, and Taung Pyan. Except for Paw San Hmwe, the other named types are generally classified within the Paw San Yin group.

Paw San rice varieties are late-maturing types with several limitations: they require a long growing period, give only moderate yields, can be grown only once a year, and are photoperiod-sensitive. To overcome these weaknesses, the Department of Agricultural Research (DAR, Myanmar) and the Japan International Cooperation Agency (JICA) jointly implemented the project “Enhancing Myanmar’s Rice Sector Using Genomic Information Technology” from 2018 to 2024.

New high-yielding, season-flexible Paw San varieties

As a result of this project, two new fragrant Paw San varieties, Yezin Paw San-1 and Yezin Paw San-2, were successfully developed, combining good eating quality with higher yield and the ability to be grown in any season. These new varieties released by the Department of Agricultural Research can be cultivated year-round (as both summer and monsoon rice), have a high-yielding plant type, produce more panicles and grains per panicle than the traditional Paw San Hmwe parent, and bear longer panicles. Farmers are therefore encouraged to widely adopt Yezin Paw San-1 and Yezin Paw San-2 as improved, good-quality, medium-duration rice varieties.

Development of chemical-free “Yekyi Paw San” in the Ayeyarwady Region

About 75 years after the original Paw San Hmwe was released in 1944, Myanmar has now produced high-yielding, season-flexible Yezin Paw San types. In parallel, the Regional Research Center (RRC, Myaungmya), under guidance from the Ayeyarwady Region Government, carried out a soil-conservation and Paw San quality-improvement study titled “Chemical-free Yekyi Paw San” during the monsoon seasons from 2022 to 2025. This farmer participatory trial was conducted in Nwar Yae Taik village, Ye Kyi Township, Kyonpyaw District, on the farm of U Kyi Khaing Soe, and included six Paw San types: the Paw San Bay Kyar group (Ayeyarwady Paw San Gyi and Pyarpon Paw San Gyi) and the Paw San Yin group (Pyarpon Paw San, Shwe War Yin, Myaungmya Paw San, and Shwebo Paw San) (Lwin, 2026).

Soil and crop management practices used to improve soil fertility and grain quality; the following practices were applied:

- (i) Green-manure and compost system: At monsoon-rice harvest, stubble was left about 1.5 feet high, followed by ploughing, application of 50 baskets of cow-dung compost per acre, and pre-monsoon incorporation of *Sesbania* (locally “Paik Hsan Hlyaw”) with a second ploughing at flowering.
- (ii) Humus-based natural fertilizer: A new humus-based organic fertilizer formula was applied at tillering and panicle-initiation stages to improve soil structure and nutrient availability.

- (iii) The planting date of the seasonal rice variety, Ayeyarwady Paw San Gyi, was adjusted to shorten its growth duration and reduce the time and effort required for crop management. The seeds were sown in the nursery in mid-August, and the 30-day-old seedlings were transplanted in mid-September. The spacing between plants and rows was 9 inches by 9 inches.
- (iv) Biological pest and disease control: To avoid chemical use, a biopesticide was sprayed against planthoppers and leafhoppers, and *Trichoderma* fungal packs (five packs per acre, five sprays) were used to manage rice blast, resulting in chemical-free production (Lwin, 2026).

After cultivation, available potassium, phosphorus, and organic matter in the soil increased significantly, while soil physical properties improved, input costs decreased, marketable profits increased, and the rice produced was healthier, tastier, and of better cooking quality.

Performance and quality of chemical-free Yekyi Paw San

Based on multi-year trials, Ayeyarwady Paw San Gyi was selected for scaling under the chemical-free technology. With support from a national economic-development fund, farmers collectively expanded cultivation to 250 acres, achieving an average yield of 95 baskets per acre. Laboratory analyses showed that this organically grown Paw San rice had a stronger aromatic fragrance, a softer and tenderer texture when cooked, better tolerance to cooking, and greater stickiness (Lwin, 2026).

Awards and market recognition

At the Ayeyarwady Paw San Forum 2025 held on 6 March 2025, where 41 Paw San varieties competed, the chemical-free Ye Kyi Paw San won first prize, based on grain appearance, cooking characteristics, eating quality, and the farmer's cultivation system. The same product also gained popularity at MSME exhibitions and, representing Ayeyarwady Region at the 79th Union Day MSME product fair and market, received the third-place "Best Research and Innovation" award.

Future outlook for Myanmar's fragrant Paw San rice

If Paw San rice is grown systematically, matching varieties to suitable soils and local conditions, optimizing fertilizer types and application methods, adopting improved planting systems, and making effective use of humus-based organic fertilizers, production of quality Paw San like the chemical-free Ye Kyi Paw San can be expanded. This would strengthen the Paw San market, increase incomes for farmers and domestic and export traders across the supply chain, and improve market access, sales systems, and collaboration. Care must be taken to prevent mixing of varieties, landraces, and off-types to maintain varietal purity.

Viewed in past, present, and future of Myanmar Paw San Hmwe assume that the "past" covers 1944 to the 2008 Nargis cyclone period, while the "present" spans the post-Nargis era from 2009 to today. By addressing past weaknesses and through corresponding efforts among producers, traders, and local organizations to improve quality, stabilize prices, and strengthen markets for

regional Paw San Hmwe types, Myanmar's fragrant Paw San rice can secure a bright and prosperous future (Lwin, 2026).

Conclusion

Paw San Hmwe is one of the most valuable indigenous rice varieties in Myanmar. It was recognized both domestically and internationally for its superior grain quality, aroma, and cooking quality. This study reviewed historical and agricultural records to clarify the true origin and distribution of the variety. Evidence indicates that Paw San Hmwe originated in the Ayeyarwady Delta region. Their environmental conditions favored Paw San Hmwe development and early cultivation. Research institutions, particularly the former Myaungmya Agricultural Research Farm, played an important role in selection and producing the variety. As demand grew and its grain quality proved desirable, cultivation spread beyond the original production regions over time. Understanding the historical development and geographical spread of Paw San Hmwe not only highlights its significance in Myanmar's agricultural heritage but also emphasizes the importance of conserving traditional rice varieties. Future research should further explore genetic characteristics and regional adaptation of Paw San Hmwe to support sustainable cultivation and breeding programs.

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