Entry No. 8RGS-0075

Category	: 8th Rice Genetics Symposium
Select Theme	: Genetic improvement
Endorsement email	:
Keyword 1	: Genotype x Environment Interactions
Keyword 2	: Breeding for specific management (water, labor, nutrients, etc)
Keyword 3	: Breeding for future markets/novel products
Title of Entry	: Genotype by environment interactions for grain yield of perennial rice and evaluation for release
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Select only one type of presentation	: 3-5 minute flash talk
Abstract	: Perennial grains have been proposed to stabilise fragile lands while contributing grain and grazing inmixed farming systems. Recently, perennial rice was reported to successfully survive, regrow, and yield across a diverse range of environments in Southern China and Laos, with perennial rice PR23 derived from (Oryza sativa L./O. longistaminata) being identified as a prime candidate for release to farmers. Genotype by environment (G x E) interactions were investigated in 22 perennial rice derivatives over four successive growing seasons at three sites in Yunnan in southern China and one site in Lao PDR. The Main findings are as below. (1) The G x E interaction accounted for 25.7 % of the total sum of squares, with environment and genotype responsible for 57.4 % and 16.9%, respectively. (2) Genotype groups differed in adaptation to these diverse environments. G5 (PR23) was high-yielding and broadly adapted across environments, while G1 (e.g., Line 147a) was low-yielding and poorly adapted. Other genotype groups showed preferential adaptation: G3 (e.g., Bt69) to Simao/Dry Season (E3 and E4), G4 (e.g. Line 255) to Menglian/Wet Season (E1 and E2), G2 (Line TZ) to Jing Hong 2013 (E7), and G6 (e.g., Line 56) to Jing Hong 2102 and Na Pok (E6 and E5). The high yield and broad adaptation of PR23 (G5) over environments makes it a prime candidate for release to stabilize fragile lands in the humid and subhumid tropics. What's more, for release, the new evaluation for PR23 was carried, (1) comparing its survival, regrowth, performance, and adaptation with annual rices across nine ecological regions in Yunnan Province of China, (2) examining the economic costs and benefits of perennial versus annual rice there. And as a result, PR23 is proposed for release to farmers because of its comparable grain yields to annual rices, it

acceptable grain and milling quality, its cost and labour savings, and the likely benefits to soil stability and ecological sustainability, along with more flexible farming systems. The results has been published in 2017 Field Crops Research and 2018 sustainability.

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