

RESEARCH BACKGROUND

Malaysia has loss millions of Ringgit Malaysia (RM) on rice yield to drought.

Development of drought resilience variety is an efficient solution for this abiotic challenge.

Malaysia Nuclear Agency has successfully develop an advanced mutant rice, NMR152 using gamma irradiation.

Since drought is a complex trait controlled by multiple response (physiology and morphology) a systematic assessment to analyze effect of drought towards different variety is crucial.

RESEARCH APPROACH

1 Plant material preparation

NMR151, NMR152, MR219, UKM RC17, UKM RC19 & Vandana seedlings transferred into pot 25 days after sow (DAS). The pots are arranged in RCBD.

2 Drought stress (DS) and control

Water deficit: Irrigation halt at 63 DAS. Plant re-irrigated as tensiometer reading fell under -30 to -50kPa & cracked soil surface.

Control: Maintain irrigation, once every 2 days, throughout planting.

3 Leaf Rolling (LR) & Leaf Drying (LD) data

The scoring is a visual assessment to determine drought resistance level in rice based on Standard Evaluation System for rice (IRRI, 2013). The score recorded differences observed between variety in both treatment that occur post 10 days of DS started

Scale	Description		Rate
	LR	LD	
0	Healthy	No symptoms	Highly resistant
1	Start to folds	Slight tip drying	Resistant
3	Folding (deep V-shaped)	Tip drying extend ¼ length in most leaf	Moderately resistant
5	Fully cupped (U-shaped)	¼ to ½ of leaf fully dried	Moderately susceptible
7	Margins touching (O-shaped)	More than 2/3 of all leaves fully dried	Susceptible
9	Tightly rolled	All dead	Highly susceptible

4 Yield data

14th days of drought treatment, leaf area, leaf width & height were measured. Grain are harvested & labelled accordingly at 93 DAS. Filled grain per plant are counted and weight and panicle length for each variety recorded.

ACKNOWLEDGEMENT

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The Effect of Drought Stress on Physiological Traits & Grain Yield of Drought Tolerant Rice Mutant Lines

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DISCUSSION

The filled grain shows NMR152 are able to maintain high yielding even in water deficit condition. Leaf average width comparison and leaf scoring for both LR and LD also signify ability of NMR152 to minimize the effect of water deficit unlike other variety that shows adverse drying and rolling.

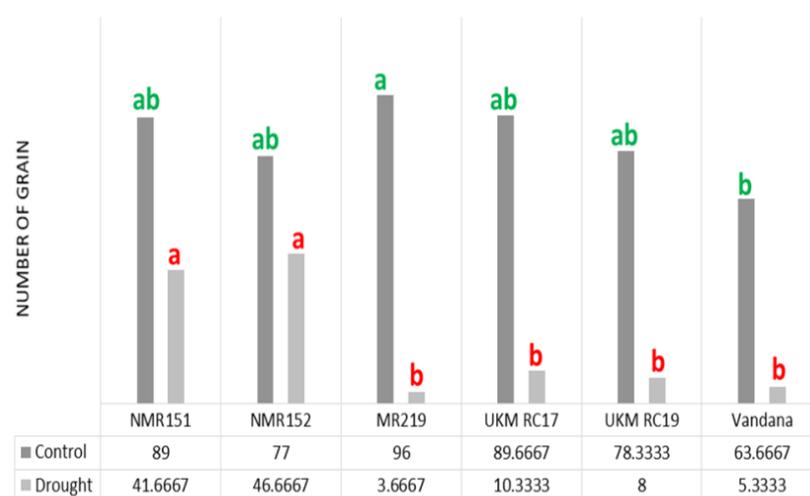
CONCLUSION

Favorable traits has been shown by NMR152 in water deficit condition, including high yielding and low score for LD and LR. Thus may portrays the potentials for the advance mutant lines, NMR152 to become our nation's drought resilience variety with high yielding to overcome huge losses towards the abiotic factor.

RESEARCH FINDINGS

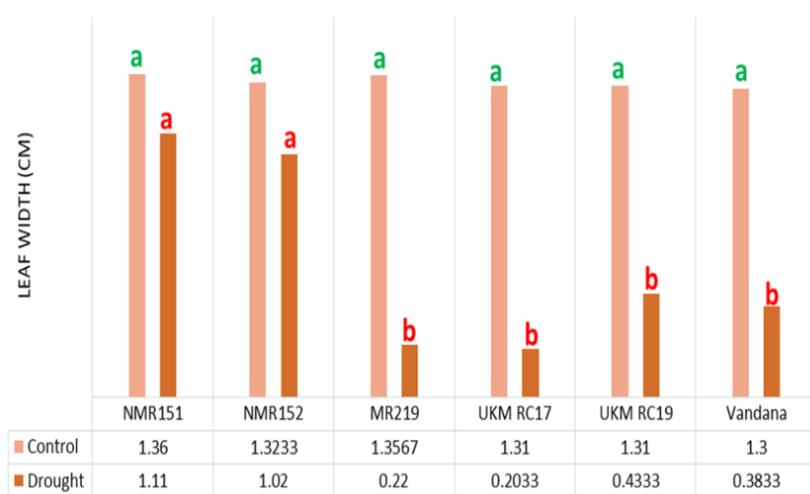
The mean value of filled grain for NMR151 and NMR152 shows a significant differences when compared to other four variety in drought treatment (red font). While MR219 has the highest mean value of filled grain for control (green font) among all six variety, shows drastic drops for mean value for drought treatment.

FILLED GRAIN COMPARISON OF VARIETY



Leaf average width across all six variety in control shows slight to none differences (green font). However, the mean value of drought treatment (red font) varied significantly for NMR152 and NMR151 when compared to other four varieties, MR219, UKM RC17, UKM RC19 and Vandana.

LEAF AVERAGE WIDTH COMPARISON OF VARIETY



NMR151 and NMR152 score relatively low for LR and LD as compared to parent, MR219 that has the highest score across all six variety

LEAF ROLLING & LEAF DRYING

