



TWA/40/21

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**INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS**  
GENEVA

**TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS**

**Fortieth Session**  
**Brasilia, May 16 to 20, 2011**

**DEVELOPMENT OF REGIONAL SET OF EXAMPLE VARIETIES FOR  
SOUTH EAST ASIA FOR THE TEST GUIDELINES FOR RICE**

*document prepared by the Office of the Union*

1. At its thirty-eighth session, held in Seoul, Republic of Korea, from August 31 to September 4, 2009, the Technical Working Party for Agricultural Crops (TWA), received a report from Mr. Edilberto Redoña, International Rice Research Institute (IRRI), concerning the development of a set of example varieties for rice for South-East Asia. The TWA agreed to invite him to present the full results for consideration at its thirty-ninth session.
2. Mr. Redoña was not able to attend the thirty-ninth session of the TWA, held in Osijek, Croatia from May 24 to 28, 2010. However, he expressed his willingness to attend a future session of the TWA.
3. The annex to this document contains the presentation submitted by Mr. Redoña to be discussed by the TWA at its fortieth session.

[Annex follows]

Presentation prepared by Edilberto Redoña, Senior Scientist (Plant Breeding) & Coordinator,  
International Network for Genetic Evaluation of Rice (INGER),  
International Rice Research Institute (IRRI)

# Development of Regional Sets of Example Varieties for the Test Guidelines for Rice

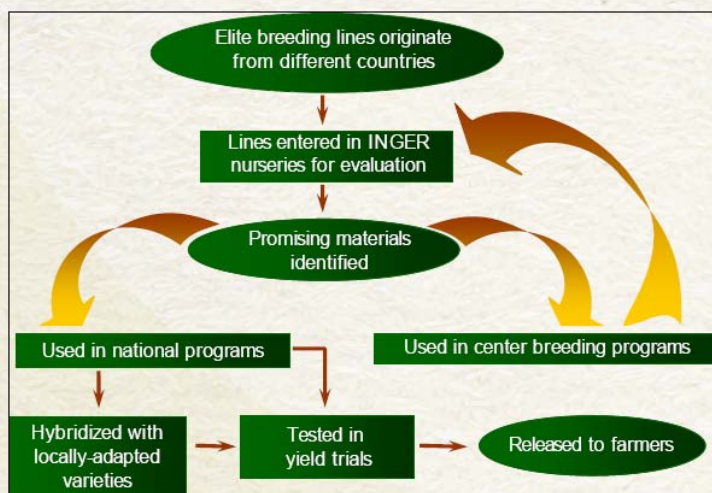
Redoña ED, NM Singson, CU Toledo  
International Network for Genetic Evaluation of Rice (INGER)

## INGER

- International Network for Genetic Evaluation of Rice (<http://seeds.irri.org/inger>)
- Consortia of national agricultural research extension systems (NARES) and international agricultural research centers (IARCs)
- Oldest multilateral rice germplasm exchange and evaluation network (1975)



## INGER Nurseries



- 50 types of international trials since 1975
- Recent years: 115 locations, 31 countries

## INGER/UPOV Collaboration

- 2004 UPOV-INGER Workshop on the Protection of Plant Breeder's Rights (Thailand): decided to establish a regional set of example varieties for Distinctness, Uniformity and Stability (DUS) testing
- Aim: to have a consistent basis for defining a state of expression of a given character (e.g. 65 characters in the UPOV Rice Test Guidelines; 17 asterisked)





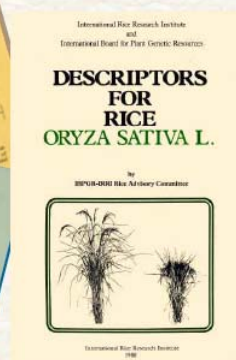
## Example Varieties

- Example varieties: needed to harmonize states of expression for characteristics with continuous variation and/or which are influenced by the environment
- Particularly important for asterisked characters or those included in all variety descriptions
- Can be used to help resolve differences in germplasm characterization for some descriptor states to come up with a single system of describing a variety



## Different Rice Descriptors

- Pre-Existing Guidelines
  - UPOV Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability for Rice: used by PVP Offices
  - IRRI Descriptors for Rice: used by genebanks
  - Standard Evaluation System (SES) for Rice: used by varietal improvement scientists
- Differences
  - UPOV = 65 → 22 are not included in IRRI DR
  - IRRI / IPBGR = 45 (agronomic/morphological)
  - INGER (SES) = 112



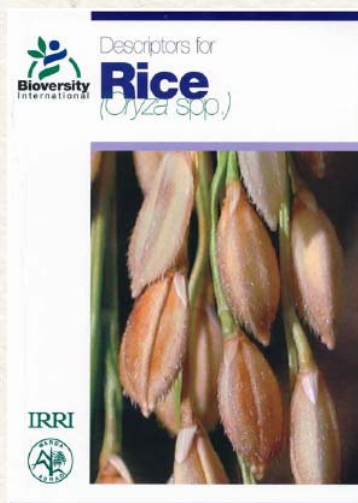
## Basis for Selecting Candidate EVs

- Varieties of common knowledge
- Pure, uniform, stable
- Widely and freely available
- Easy to multiply/maintain
- Can be grown in both wet and dry season (tropical areas) if character has to be evaluated in the field
- Diverse set: all desired states of expression to be covered by the minimum number of example varieties
- For regional cooperation: wide adaptation
- Can be grown in many countries with similar conditions



## Harmonized Variety Descriptions

- Bioversity International, IRRI, Africa Rice (2007)
  - [http://www.bioversityinternational.org/index.php?id=19&user\\_bioversitypublications\\_pil%5BshowUid%5D=2262](http://www.bioversityinternational.org/index.php?id=19&user_bioversitypublications_pil%5BshowUid%5D=2262)
  - Several sets of UPOV rice characteristics has been incorporated in the revised descriptors





## Composing the INEVDUST

- Initially, 90 INGER materials (released as varieties or used as parents in crosses) from 20 countries and 3 international centers, evaluated in 2004 dry season and were characterized in 2005 wet season.
- Also, 66 out of 95 IR lines for INEVDUST passed the routine seed health tests. Additional entries also underwent seed processing and seed health testing.



## Priority: Irrigated Rice Ecosystem

- Favorable environment; thus high probability of a successful trial
- Anticipated that application for PVP would be for varieties suited to this ecosystem
- Example varieties for irrigated environment could serve as EVs for other ecosystems/ other EVs could eventually be assembled by NARES



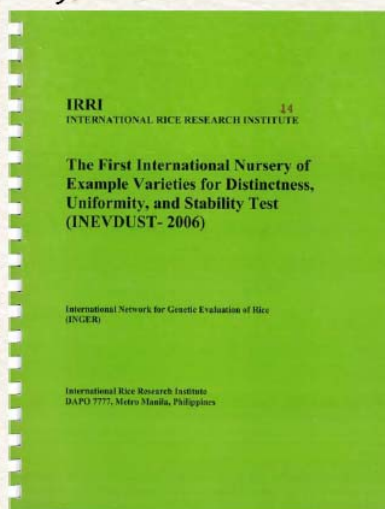
## Procedure for Regional Cooperation

- Candidate EVs nominated by NARES and IRRI
- IRRI to identify candidate EVs from the IRRI Genebank, breeding programs and INGER based on asterisked characters.
- NARES candidate EVs to be sent to IRRI
- INEVDUST to be distributed to CORRA member countries and to other interested countries
- Data collected will be sent immediately to IRRI for analysis.
- Results will be shared with participants.



## INEVDUST Objective

- To develop regional sets of example varieties for the 17 asterisked characters in rice for use in Distinctness, Uniformity and Stability Tests (DUST) in South and Southeast Asia, Southern China
- All desired states of expression for the asterisked characters should be covered with the minimum number of example varieties



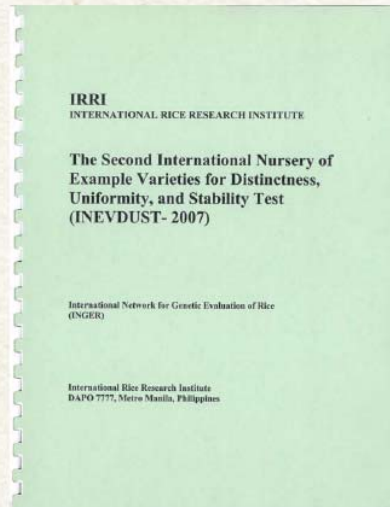


# INEVDUST Entries

- 2006: 1<sup>st</sup> INEVDUST
  - 78 Entries from six NARS\* and from IRRI
- 2007: 2<sup>nd</sup> INEVDUST
  - 76 Entries from six NARS\* and from IRRI
- 2008: 3<sup>rd</sup> INEVDUST
  - 77 Entries from four NARS\*\* and from IRRI
- 2009: 4<sup>th</sup> INEVDUST
  - 77 Entries from four NARS\*\* and from IRRI

\*NARS: Bangladesh, India, Philippines, Sri Lanka, Colombia, Taiwan

\*\*Bangladesh, India, Philippines, Sri Lanka



40<sup>th</sup> Session, Technical Working Party for Agricultural Crops (TWA)  
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Brasilia, Brazil  
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# INEVDUST Entries

2006 List

2007 List

2008 List

2009 List

Year	Country	Entry	Year	Country	Entry	Year	Country	Entry	Year	Country	Entry
2006	Bangladesh	1	2007	Bangladesh	1	2008	Bangladesh	1	2009	Bangladesh	1
2006	India	2	2007	India	2	2008	India	2	2009	India	2
2006	Philippines	3	2007	Philippines	3	2008	Philippines	3	2009	Philippines	3
2006	Sri Lanka	4	2007	Sri Lanka	4	2008	Sri Lanka	4	2009	Sri Lanka	4
2006	Colombia	5	2007	Colombia	5	2008	Colombia	5	2009	Colombia	5
2006	Taiwan	6	2007	Taiwan	6	2008	Taiwan	6	2009	Taiwan	6
2006	IRRI	7	2007	IRRI	7	2008	IRRI	7	2009	IRRI	7
2006	Bangladesh	8	2007	Bangladesh	8	2008	Bangladesh	8	2009	Bangladesh	8
2006	India	9	2007	India	9	2008	India	9	2009	India	9
2006	Philippines	10	2007	Philippines	10	2008	Philippines	10	2009	Philippines	10
2006	Sri Lanka	11	2007	Sri Lanka	11	2008	Sri Lanka	11	2009	Sri Lanka	11
2006	Colombia	12	2007	Colombia	12	2008	Colombia	12	2009	Colombia	12
2006	Taiwan	13	2007	Taiwan	13	2008	Taiwan	13	2009	Taiwan	13
2006	IRRI	14	2007	IRRI	14	2008	IRRI	14	2009	IRRI	14
2006	Bangladesh	15	2007	Bangladesh	15	2008	Bangladesh	15	2009	Bangladesh	15
2006	India	16	2007	India	16	2008	India	16	2009	India	16
2006	Philippines	17	2007	Philippines	17	2008	Philippines	17	2009	Philippines	17
2006	Sri Lanka	18	2007	Sri Lanka	18	2008	Sri Lanka	18	2009	Sri Lanka	18
2006	Colombia	19	2007	Colombia	19	2008	Colombia	19	2009	Colombia	19
2006	Taiwan	20	2007	Taiwan	20	2008	Taiwan	20	2009	Taiwan	20
2006	IRRI	21	2007	IRRI	21	2008	IRRI	21	2009	IRRI	21
2006	Bangladesh	22	2007	Bangladesh	22	2008	Bangladesh	22	2009	Bangladesh	22
2006	India	23	2007	India	23	2008	India	23	2009	India	23
2006	Philippines	24	2007	Philippines	24	2008	Philippines	24	2009	Philippines	24
2006	Sri Lanka	25	2007	Sri Lanka	25	2008	Sri Lanka	25	2009	Sri Lanka	25
2006	Colombia	26	2007	Colombia	26	2008	Colombia	26	2009	Colombia	26
2006	Taiwan	27	2007	Taiwan	27	2008	Taiwan	27	2009	Taiwan	27
2006	IRRI	28	2007	IRRI	28	2008	IRRI	28	2009	IRRI	28
2006	Bangladesh	29	2007	Bangladesh	29	2008	Bangladesh	29	2009	Bangladesh	29
2006	India	30	2007	India	30	2008	India	30	2009	India	30
2006	Philippines	31	2007	Philippines	31	2008	Philippines	31	2009	Philippines	31
2006	Sri Lanka	32	2007	Sri Lanka	32	2008	Sri Lanka	32	2009	Sri Lanka	32
2006	Colombia	33	2007	Colombia	33	2008	Colombia	33	2009	Colombia	33
2006	Taiwan	34	2007	Taiwan	34	2008	Taiwan	34	2009	Taiwan	34
2006	IRRI	35	2007	IRRI	35	2008	IRRI	35	2009	IRRI	35
2006	Bangladesh	36	2007	Bangladesh	36	2008	Bangladesh	36	2009	Bangladesh	36
2006	India	37	2007	India	37	2008	India	37	2009	India	37
2006	Philippines	38	2007	Philippines	38	2008	Philippines	38	2009	Philippines	38
2006	Sri Lanka	39	2007	Sri Lanka	39	2008	Sri Lanka	39	2009	Sri Lanka	39
2006	Colombia	40	2007	Colombia	40	2008	Colombia	40	2009	Colombia	40
2006	Taiwan	41	2007	Taiwan	41	2008	Taiwan	41	2009	Taiwan	41
2006	IRRI	42	2007	IRRI	42	2008	IRRI	42	2009	IRRI	42
2006	Bangladesh	43	2007	Bangladesh	43	2008	Bangladesh	43	2009	Bangladesh	43
2006	India	44	2007	India	44	2008	India	44	2009	India	44
2006	Philippines	45	2007	Philippines	45	2008	Philippines	45	2009	Philippines	45
2006	Sri Lanka	46	2007	Sri Lanka	46	2008	Sri Lanka	46	2009	Sri Lanka	46
2006	Colombia	47	2007	Colombia	47	2008	Colombia	47	2009	Colombia	47
2006	Taiwan	48	2007	Taiwan	48	2008	Taiwan	48	2009	Taiwan	48
2006	IRRI	49	2007	IRRI	49	2008	IRRI	49	2009	IRRI	49
2006	Bangladesh	50	2007	Bangladesh	50	2008	Bangladesh	50	2009	Bangladesh	50
2006	India	51	2007	India	51	2008	India	51	2009	India	51
2006	Philippines	52	2007	Philippines	52	2008	Philippines	52	2009	Philippines	52
2006	Sri Lanka	53	2007	Sri Lanka	53	2008	Sri Lanka	53	2009	Sri Lanka	53
2006	Colombia	54	2007	Colombia	54	2008	Colombia	54	2009	Colombia	54
2006	Taiwan	55	2007	Taiwan	55	2008	Taiwan	55	2009	Taiwan	55
2006	IRRI	56	2007	IRRI	56	2008	IRRI	56	2009	IRRI	56
2006	Bangladesh	57	2007	Bangladesh	57	2008	Bangladesh	57	2009	Bangladesh	57
2006	India	58	2007	India	58	2008	India	58	2009	India	58
2006	Philippines	59	2007	Philippines	59	2008	Philippines	59	2009	Philippines	59
2006	Sri Lanka	60	2007	Sri Lanka	60	2008	Sri Lanka	60	2009	Sri Lanka	60
2006	Colombia	61	2007	Colombia	61	2008	Colombia	61	2009	Colombia	61
2006	Taiwan	62	2007	Taiwan	62	2008	Taiwan	62	2009	Taiwan	62
2006	IRRI	63	2007	IRRI	63	2008	IRRI	63	2009	IRRI	63
2006	Bangladesh	64	2007	Bangladesh	64	2008	Bangladesh	64	2009	Bangladesh	64
2006	India	65	2007	India	65	2008	India	65	2009	India	65
2006	Philippines	66	2007	Philippines	66	2008	Philippines	66	2009	Philippines	66
2006	Sri Lanka	67	2007	Sri Lanka	67	2008	Sri Lanka	67	2009	Sri Lanka	67
2006	Colombia	68	2007	Colombia	68	2008	Colombia	68	2009	Colombia	68
2006	Taiwan	69	2007	Taiwan	69	2008	Taiwan	69	2009	Taiwan	69
2006	IRRI	70	2007	IRRI	70	2008	IRRI	70	2009	IRRI	70
2006	Bangladesh	71	2007	Bangladesh	71	2008	Bangladesh	71	2009	Bangladesh	71
2006	India	72	2007	India	72	2008	India	72	2009	India	72
2006	Philippines	73	2007	Philippines	73	2008	Philippines	73	2009	Philippines	73
2006	Sri Lanka	74	2007	Sri Lanka	74	2008	Sri Lanka	74	2009	Sri Lanka	74
2006	Colombia	75	2007	Colombia	75	2008	Colombia	75	2009	Colombia	75
2006	Taiwan	76	2007	Taiwan	76	2008	Taiwan	76	2009	Taiwan	76
2006	IRRI	77	2007	IRRI	77	2008	IRRI	77	2009	IRRI	77
2006	Bangladesh	78	2007	Bangladesh	78	2008	Bangladesh	78	2009	Bangladesh	78



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**2006 (7 countries; 13 sites)**

- MYANMAR: Yezin
- THAILAND: Thanyaburi
- VIETNAM: Cantho
- BANGLADESH: Gazipur
- INDIA: Hyderabad; Pantnagar; Chatha; Coimbatore; Chinsurah; New Delhi; Bhubaneswar
- NEPAL: Hardinath
- PAKISTAN: Kala Shah Kaku

**2007 (7 countries; 8 sites)**

- THAILAND: Muang Phrae
- VIETNAM: Cantho; Hau Giang
- BANGLADESH: Gazipur
- NEPAL: NRRP, Dhanusha
- PAKISTAN: Kala Shah Kaku
- INDONESIA: Sukamandi
- PHILIPPINES: Nueva Ecija


**2008 (6 countries; 7 sites)**

- MYANMAR: Yezin
- BANGLADESH: Gazipur
- INDIA: Khudwani, Hyderabad
- NEPAL: Hardinath
- BHUTAN: Bajo
- PAKISTAN: Kala Shah Kaku



**2009 (6 countries; 11 sites)**

- THAILAND: Pathum Thani
- VIETNAM: Cantho
- INDIA: Masodha, Imphal, Anantnag, Cuttack, Allahabad, Tripura
- INDONESIA: Bogor
- NEPAL: Hardinath
- MALAYSIA: Bertam

## INEVDUST Dispatches 2006-2009



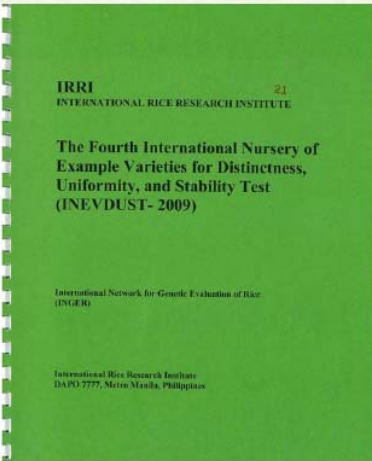
- 11 countries
- 39 trials






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## INEVDUST Nursery Establishment

- Optimal growing conditions
- Three rows per entry, 5 m long
- Transplanted conditions
- 20 x 20 cm hill spacing
- One seedling per hill
- Pest control on a need-based level
- Fertilizer and other cultural practices according to local practice



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## Asterisked Characters

Trait	Stage	State (Scores)							
Leaf Anthocyanin Coloration of Auricles (Early-Boot Stage)	40	Absent (1)	Present (9)						
Time of Heading (50% of plants with heads)	55		Early (70-90 days) (3)	Medium (90-110 days) (5)	Late (>110 days) (7)				
Flag Leaf: Attitude of Blade	50	Erect (1)	Semi-erect (3)	Horizontal (5)	Recurved (7)				
Spikelet: Pubescence of Lemma	60-80	Absent or Very Weak (1)	Weak (3)	Medium (5)	Strong (7)	Very Strong (9)			
Lemma: Anthocyanin Coloration of Apex (Early Observation)	65	Absent or Very Weak (1)	Weak (3)	Medium (5)	Strong (7)	Very Strong (9)			
Spikelet: Color of Stigma	65	White (1)	Light Green (2)	Yellow (3)	Light Purple (4)	Purple (5)			
Non prostrate varieties only: Stem Length	70-90	Very Short (<51 cm) (1)	Short (51-90 cm) (3)	Medium (91-130 cm) (5)	Long (131-150 cm) (7)	Very Long (>150 cm) (9)			
Stem: Anthocyanin Coloration of Nodes	70	Absent (1)	Present (9)						
Panicle: Distribution of Awns	70-80	Tip only (1)	Upper Quarter Only (2)	Upper Half Only (3)	Upper Three Quarters Only (4)	Whole Length (5)			
Panicle: Length of Main Axis	72-90	Short (<20 cm) (3)	Medium (21-30 cm) (5)	Long (>30 cm) (7)					
Panicle: Attitude in relation to Stem	90	Upright (1)	Semi-upright (2)	Slightly Drooping (3)	Strongly Drooping (4)				
Flag Leaf: Attitude of Blade (Late Observation)	90	Erect (1)	Semi-erect (3)	Horizontal (5)	Recurved (7)				
Panicle: Attitude of Branches	90	Erect (1)	Semi-erect (3)	Spreading (5)					
Decorticated grain: Length	92	Short (<5.5 mm) (3)	Medium (5.51-6.6 mm) (5)	Long (>7.5 mm) (7)					
Decorticated grain: Shape	92	Round (<1.5) (1)	Semi-round (1.5-1.99) (2)	Half Spindle-Shaped (2.00-2.49) (3)	Spindle-Shaped (2.50-2.99) (4)	Long Spindle-Shaped (>2.99) (5)			
Decorticated Grain: Color	92	White (1)	Light Brown (2)	Variegated Brown (3)	Dark Brown (4)	Light Red (5)	Red (6)	Variegated Purple (7)	Purple (8) Dark Purple/Black (9)
Decorticated Grain: Aroma	92	Absent or Weak (1)	Weak (2)	Strong (3)					

- 17 characters; 71 states of expression; According to UPOV's DUS Test Guidelines for Rice (2004)

## INEVDUST Data Returns

REGION/COUNTRY/LOCATION		2006	2007	2008	2009
<b>SOUTHEAST ASIA</b>					
MYANMAR	YEZIN	✓		✓	
THAILAND	PATHUMTHANI	✓			
	THANYABURI			✓	✓
PHILIPPINES	MUNOZ, NUEVA ECIIJA		✓		
<b>SOUTH ASIA</b>					
BANGLADESH	GAZIPUR	✓	✓	✓	
INDIA	RAJENDRANAGAR, HYDER.	✓	✓	✓	
	PANTNAGAR, U.P.	✓			
	PULLA, A.P.	✓			
	CHINSURAH, W. BENGAL		✓		
	SHALIMAR, SRINAGAR, J & K		✓		
	RAIPUR, M.P.		✓		
	MASODHA, FAIZABAD		✓		
	KHUDWANI, ANANTNAG			✓	
	KANKE, RANCHI			✓	
	S.H.I.A.T.S. ALLAHABAD				✓
	IMPAL, MANIPUR				✓
	CRRI, CUTTACK				✓
NEPAL	HARDINATH, DHANUSHA	✓			

- 4 years
- 24/39 trials (62%)
- 6 countries
- 18 sites

### No. of Sites:

2006: 7 sites, 6 countries  
2007: 7 sites, 4 countries  
2008: 6 sites, 5 countries  
2009: 4 sites, 2 countries



## INEVDUST Geographical Distribution



## Data Analysis

[illegible]

- Quality check
- Frequency counts of each state of expression for each trait and each variety in 2 regions during 4 years (2006-2009).
- Obtained entries with consistent state of expression for an asterisked trait across years in a specific region.
- Acceptable consistency level: same state of expression in at least 80% of trials
- Obtained minimum number of varieties/ lines covering the maximum number of states of expression for the 17 asterisked characters within the region for 3 years.

## Number of entries with consistent states of expression for asterisked traits in Myanmar, Thailand, & Philippines

Trait	State	Number of entries
Leaf Anthocyanin Coloration of Auricles (Early-Boot Stage)	Absent or Very Weak	73
Time of Heading (50% of plants with heads)	Early	3
	Medium	3
	Late	1
Flag Leaf: Attitude of Blade	Erect	20
	Semi-erect	3
Spikelet: Pubescence of Lemma	Weak	2
Lemma: Anthocyanin Coloration of Apex (Early Observation)	Absent or Very Weak	2
Spikelet: Color of Stigma (Stage 65)	White	66
	Purple	2
Non prostrate varieties only: Stem Length	Short	1
	Medium	2
Stem: Anthocyanin Coloration of Nodes (Stage 70)	Absent	12
Panicle: Distribution of Awns	Tip only	52
	Whole Length	1

- In SE Asia, some traits were stable but the states were not well covered by the set of candidate varieties

## Number of entries with consistent states of expression for required traits in Myanmar, Thailand, & Philippines

Trait	State	Number of entries
Panicle: Length of Main Axis (Stage 72-90)	Medium	45
Panicle: Attitude in relation to Stem (Stage 90)	Semi-upright	1
	Slightly Drooping	2
Flag Leaf: Attitude of Blade (Late Observation)	Erect	7
	Semi-Erect	2
	Recurved	2
Panicle: Attitude of Branches (Stage 90)	Semi-erect	29
Decorticated grain: Length	Medium	3
	Long	3
Decorticated grain: Shape	Long Spindle-Shaped	3
Decorticated Grain: Color	White	22
Decorticated Grain: Aroma	Absent or Weak	63

In SE Asia, the test set did not cover all states of expression of the 17 traits in a stable manner.



Minimum no. of varieties covering maximum no. of states of expression for  
17 traits in Myanmar, Thailand, & Philippines

Trait	Varieties											
	THU KIA YIN	YEZIN LONE THWE	IR 70	CHIANUNG SEN YU 23	IR 30	IR 36	IR 58	IR 9203-25-1-3 (PSB RC92)	IR 52713-2B-1-2 (PSB RC88)	IR 65185-3B-8- 3-2(PSB RC84)	FR 13A	WCI240 (ACC13742)
Leaf anthocyanin coloration of auricles	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
Time of heading	early	medium	medium	medium		early	early					
Flag leaf: attitude of blade (early observation)	semi-erect	semi-erect	erect	semi-erect	erect	erect			erect	erect		
Spikelet: pubescence of lemma	weak	weak							medium			
Lemma: anthocyanin coloration of apex	absent or very weak	absent or very weak										
Spikelet: color of stigma	white	white	white		white	white	white	white	purple	white	white	purple
Non prostrate varieties only: stem length	medium	medium		short		short	short					
Stem: anthocyanin coloration of nodes	absent	absent	absent		absent	absent	absent			absent	absent	
Panicle: distribution of awns	tip only		tip only	tip only	tip only		tip only	tip only	tip only		whole length	whole length
Panicle: length of main axis	spreading	spreading	spreading	spreading	spreading		spreading	spreading	spreading	short	spreading	spreading
Panicle: attitude in relation to stem	slightly drooping	slightly drooping		semi-upright	semi-upright							
Flag leaf: attitude of blade (late observation)	recurved	recurved	erect	semi-erect	erect			semi-erect	erect	erect		
Panicle: attitude of branches	semi-erect	semi-erect	semi-erect	semi-erect		semi-erect		semi-erect	semi-erect			
Decorticated grain: length	medium	long	medium	long	medium		medium	medium			medium	medium
Decorticated grain: shape	long-spindle shaped	long-spindle shaped	spindle-shaped	long-spindle shaped		long-spindle shaped			long-spindle shaped	long-spindle shaped		
Decorticated grain: color	white	white	white	white		white	white	white		white		white
Decorticated grain: scent	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak

\* 30 states of expression from 17 traits were covered by 12 candidate varieties.

Next Step: Include varieties with traits of expression for  
following traits in Southeast Asia

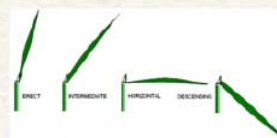
Trait	State of Expression	Score
Leaf anthocyanin coloration of auricles	Present	9
Time of heading	Very early (< 70 days)	1
Flag leaf attitude of blade (early observation)	Horizontal	5
	Recurved	7
Spikelet: pubescence of lemma	Absent or very weak	1
	Strong	7
	Very Strong	9
Lemma: anthocyanin coloration of apex (Early observation)	Weak	3
	Medium	5
	Strong	7
	Very Strong	9
Spikelet Color of Stigma	Light Green	2
	Yellow	3
	Light Purple	4
Stem length for non-prostrate varieties	Very short (<51 cm)	1
	Long (131-150 cm)	7
	Very Long (>150 cm)	9
Stem anthocyanin coloration of nodes	Present	9
Panicle distribution of awns	Upper quarter only	2
	Upper half only	3
	Upper three quarters only	4
Panicle length of main axis	Long (>30 cm)	7
Panicle attitude in relation to stem	Upright	1
	Strongly drooping	4
Flag leaf attitude of blade (late observation)	Horizontal	5
Panicle attitude of branches	Erect	1
	Spreading	5
Decorticated grain length	Short (<5.5 mm)	3
Decorticated grain shape	Round (<1.5)	1
	Semi-Round (1.5-1.99)	2
	Half-spindle-shaped (2.00-2.49)	3
Decorticated grain color	Light brown	2
	Variegated brown	3
	Dark Brown	4
	Light Red	5
	Red	6
	Variegated purple	7
	Purple	8
	Dark Purple/Black	9
Decorticated grain: aroma	Weak	2
	Strong	3



- In SE Asia, 41 states of expression (out of 71) from 17 asterisked characters were not stably covered by candidate varieties.

Trait	State	Number of entries
Leaf Anthocyanin Coloration of Auricles (Early-Boot Stage)	Absent or Very Weak	3
Flag Leaf: Attitude of Blade	Erect	3
Spikelet: Pubescence of Lemma	Medium	1
Lemma: Anthocyanin Coloration of Apex (Early Observation)	Absent or Very Weak	1
Spikelet: Color of Stigma (Stage 65)	White	1
	Light Green	1
Non prostrate varieties only: Stem Length	Short	2
Stem: Anthocyanin Coloration of Nodes (Stage 70)	Absent	1
Panicle: Distribution of Awns	Tip only	4
Panicle: Length of Main Axis (Stage 72-90)	Medium	1
Panicle: Attitude in relation to Stem (Stage 90)	Slightly Drooping	1
Flag Leaf: Attitude of Blade (Late Observation)	Semi-Erect	1
Decorticated grain: Length	Medium	1
Decorticated Grain: Color	Light Brown	1
Decorticated Grain: Aroma	Absent or Weak	20

Number of entries with consistent states of expression for required traits in Bangladesh, India, & Nepal



Minimum no. of varieties covering maximum no. of states of expression for 17 traits in Bangladesh, India, & Nepal

Trait	Variety										
	IRRI 111	IR 52	IR61979-138-1-3-2-3 (ANGELICA)	CHIANUNG SEN YU 23	FR 13A	IR 36	IR 43	IR52713-28-1-2 (PSB RC88)	IR62141-114-3-2-2-2 (PSB RC80)	Sabitri	ESWARA KORA
Leaf anthocyanin coloration of auricles	absent	absent			absent	absent	absent			absent	absent
Time of heading								medium			
Flag leaf: attitude of blade (early observation)			erect	erect	erect	erect	erect	erect			
Spikelet:pubescence of lemma	medium		medium			weak	weak				
Lemma: anthocyanin coloration of apex	absent or weak										
Spikelet: color of stigma	white									light green	purple
Non prostrate varieties only: stem length	short	short	short	short			short			short	
Stem: anthocyanin coloration of nodes	absent	absent							absent		
Panicle: distribution of awns					whole length	tip only	tip only		tip only		
Panicle: length of main axis		medium								medium	
Panicle: attitude in relation to stem				slightly drooping					slightly drooping		
Flag leaf: attitude of blade (late observation)	semi-erect		erect		erect	erect	erect				
Panicle: attitude of branches		semi-erect						semi-erect			
Decorticated grain: length			long							medium	medium
Decorticated grain: shape											
Decorticated grain: color				light brown					white		
Decorticated grain: scent		absent or weak	absent or weak	absent or weak	absent or weak			absent or weak			absent or weak

\*For South Asia, 35 (out of 71) states of expression from 17 traits were covered by 22 candidate varieties.



## Minimum no. of varieties covering maximum no. of states of expression for 17 traits in Bangladesh, India, & Nepal

Trait	Variety										
	IR 8	IR54068-B-60-1-3-3 (PSB RC102)	SINNA SIVAPPU (ACC15444)	WC1240 (ACC13742)	ARC11554 (ACC21473)	DV85	IR 58	IR 64	IR69726-116-1-3 (MATATAG 1)	IR55423-01 (NSIC RC9)	IR73885-1-4-3-2-1-6 (MATATAG 9)
Leaf anthocyanin coloration of auricles	absent	absent			absent			absent			
Time of heading							early	medium			
Flag leaf: attitude of blade (early observation)						erect					
Spikelet: pubescence of lemma											
Lemna: anthocyanin coloration of apex					strong			absent or weak			
Spikelet: color of stigma		white									
Non prostrate varieties only: stem length	short			medium	medium			short			
Stem: anthocyanin coloration of nodes			absent	present		present	absent				
Panicle: distribution of awns	upper half only		tip only								
Panicle: length of main axis				medium							
Panicle: attitude in relation to stem											
Flag leaf: attitude of blade (late observation)									semi-erect		
Panicle: attitude of branches											
Decorticated grain: length											
Decorticated grain: shape			semi-round								long-spindle shaped
Decorticated grain: color		white									
Decorticated grain: seed	absent or weak	absent or weak	absent or weak	absent or weak		absent or weak	absent or weak	absent or weak	absent or weak	absent or weak	absent or weak

## Next Step: Include varieties with following states of expression for asterisked characters in South Asia

Trait	State of Expression	Score
Leaf anthocyanin coloration of auricles	Present	9
Time of heading	Very early (< 70 days)	1
	Late (>110 days)	7
Flag leaf attitude of blade (early observation)	Semi-erect	3
	Horizontal	5
	Recurved	7
Spikelet: pubescence of lemma	Absent or very weak	1
	Weak	3
	Strong	7
	Very Strong	9
Lemna: anthocyanin coloration of apex (early observation)	Medium	5
	Strong	7
	Very Strong	9
Spikelet Color of Stigma	Yellow	3
	Light Purple	4
Stem length for non-prostrate varieties	Very short (<51 cm)	1
	Long (131-150 cm)	7
	Very Long (>150 cm)	9
Panicle distribution of awns	Upper quarter only	2
	Upper three quarters only	4



For South Asia, 41 states of expression (out of 71) were not stably covered by the set of candidate varieties examined.

## Summary



Region	Number of varieties with predominant and distinct states of expression For all traits	List of example varieties identified	States of expression not covered by identified varieties
South Asia	22	IR61979-138-1-3-2-3 (ANGELICA), IR68305-18-1-1 (MATATAG 3), DV85, IR 29, IR 36, IR 40, WC1240 (ACC13742), FR 13A, ESHWERKORRA, IR 38, IR 43, IR 8, IR52713-2B-1-2 (PSB RC88), N22, ARC11554 (ACC21473), IR64683-87-2-2-3-3 (PSB RC82), P2025-F4-159-3-1B, IR 58, IR 48, IR55423-01 (NSIC RC9), SINNA SIVAPPU (ACC15444)	36
Southeast Asia	12	THU KHA YIN, YEZIN LONE THWE, IR 70, CHIANUNG SEN YU 23, IR 30, IR 36, IR 58, IR 9202-25-1-3 (PSB RC92), IR 52713-2B-1-2 (PSB RC88), IR 65185-3B-8-3-2 (PSB RC84), FR 13A, WC1240 (ACC13742)	41

## Summary & Needs

- INEVDUST entries not diverse enough to cover all states of expression for asterisked traits
- Different minimum sets of potential example varieties identified for South and Southeast Asia
- Need to identify more candidate EVs to cover all states of expression, including those from the genebank
- Training for data collectors to ensure uniformity of descriptions and quality data generation
- NARES evaluating nurseries of candidate EVs need to link with the national PVP offices
- Provision of required resources for efficiently conducting trials
- Detailed data on INEVDUST available at INGER





# Development of Regional Sets of Example Varieties for the Test Guidelines for Rice

Redoña ED, NM Singson, CU Toledo  
International Network for Genetic Evaluation of Rice (INGER)

**IRRI**  
INTERNATIONAL RICE RESEARCH INSTITUTE



40th Session, Technical Working Party for Agricultural Crops (TWA)  
The International Union for the Protection of New Plant Varieties (UPOV)  
Brasilia, Brasil  
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[End of Annex and of document]