

# Validation of Other Distinguishable Varieties (ODV's) in Rice

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**ABSTRACT:** Other Distinguishable Variety (ODV) test is mandatory for certain self pollinated crops. Almost all notified seed testing laboratories are conducting the ODV test for genetic purity assessment in field crops. Frequent observation of variations among the STLs in the results of the ODV test warrants declaration of the lots as sub standard leading to huge loss to the producer. In order to find out validity of the ODV test, an experiment was conducted at Seed Research and Technology Center, Rajendranagar, Hyderabad for four consecutive years (2007-08 to 2010-11). Observations recorded on ODV's based on rejected seed samples revealed variation in seed texture (shape, colour and size of seed) as against authentic breeder seed. Field observations of ODV *vis-a-vis* control (breeder seed) progenies showed variation in distinguishable morphological DUS characters *viz.*, growth habit, foliage colour, flag leaf curvature, plant height, days to 50% flowering, panicle length and days to maturity. Irrespective of Seed Testing Laboratories, only 56.10% of the seed lots exhibited correctness which may lead to loss to the producer in marketing as substandard lots. The study revealed the requirement of perfect expertise and skill and also training for the seed analysts of APSSCA, APSSDC and NSC in identification of ODV's in the seed testing laboratories.

**Key words:** Other Distinguishable Varieties (ODV seeds), Grow Out Test (GOT), Rice

## INTRODUCTION

Seed producer or grower aims for higher productivity which is influenced by several factors. Among these, seed is the most critical input and the use of quality seed increases the yield of the crop by 20-25%. Requirements of a good quality seed are high germination, vigour, safe moisture content, free from insect pests and diseases, high physical purity and genetic purity. Generally, seed is tested for purity in the seed testing laboratories (STLs). The main aim of seed testing is to obtain accurate and reproducible results of seed testing with regard to seed quality parameters. In seed testing laboratories, seed samples are tested in accordance with prescribed ISTA (1999) seed testing procedures. Every year 10-15% of the rice seed lots were recorded substandard due to occurrence of more number of ODV seeds against prescribed number per kg (Indian Minimum Seed Certification Standards, 1988). The normal standards as prescribed by

ISTA, 1985 for rice are 10 seeds per kilogram for foundation seed and 20 seeds per kilogram for certified seed.

In cross pollinated crops, purity assessment is done by grow out test whereas in self pollinated crops purity assessment is done by ODV test. The purity analyst determines the purity of seeds of other distinguishable varieties present in certain crop seeds. ODV seeds will be sorted out from the tested sample variety as against authentic breeder seed. A tested sample with above prescribed number of seeds/kg seed lot will be declared as substandard and will not be released for marketing. Several producers often approach the appellate authority based on rejected order. The appellate authority may give instructions to reexamine or conduct GOT. During GOT evaluation some of the ODV seeds may exhibit true to type plant characters of the test variety. It might be due to erroneous evaluation during ODV test.

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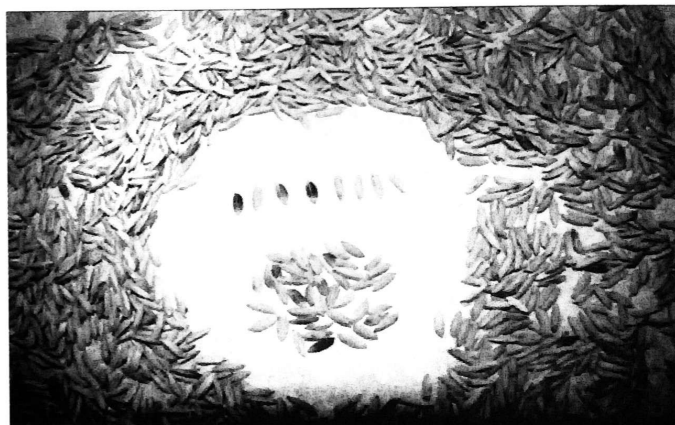
The ODV determination is done on the basis of apparent differences in the stable and well known morphological characteristics of the seed (seed texture and seed colour) of the notified varieties [1]. Evaluation of the ODV seeds in the laboratory is very difficult because of similar texture and colour of the seed of all the notified varieties and requires perfect expertise and skill in identification. Frequently some of the evaluated ODV seeds are true to type which leads to problem to producers in marketing, leading to monetary loss. Hence, there is a need to know the genuineness in identification of ODV and efficacy of results of Seed Testing Laboratories in comparison with grow out tests. Therefore, the present study was taken up with an objective to assess the efficacy of ODV test *vis-à-vis* grow out test.

#### MATERIALS AND METHODS

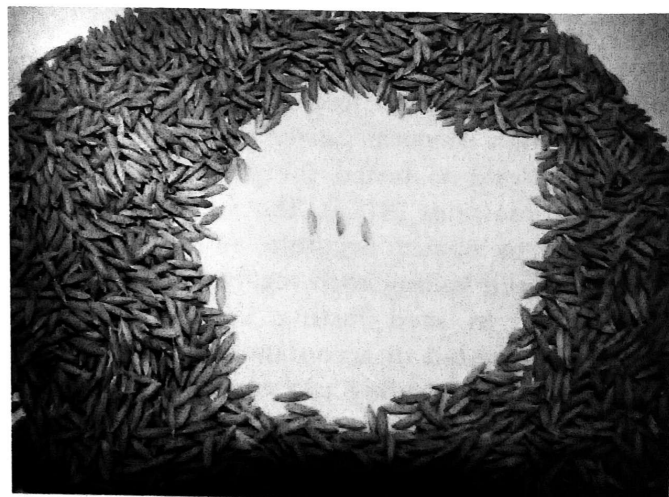
ODV seeds of rejected seed samples collected from different Seed Testing Laboratories of the Andhra Pradesh state (APSSDC, APSSCA and NSC) were subjected to grow out tests, along with authentic seed samples (breeder seed), to prove the genuineness in identification of ODV seeds and check the validity of ODV seeds through GOT. The GOT test was conducted at Seed Research and Technology Center, Rajendranagar, Hyderabad for four consecutive *Rabi* seasons (2007-08, 2008-09, 2009-10 and 2010-11). Twenty five ODV samples of rice belonging to 13 varieties *viz.*, ADT 43, BPT 5204, IET 1444, IR 64, JGL 1798, JGL 384, KRH 2, MTU 1010, Ratna, Tellahamsa, Tulasi, WGL 20471 and WGL 48684 collected from Seed Testing Laboratory, Rajendranagar during *Rabi*, 2007-08; twenty five ODV samples of rice belonging to six varieties *viz.*, BPT 5204, MTU 1010, KMR 3, WGL 20471, KRH 2 and IR 64 collected from Seed Testing Laboratory Rajendranagar (18 samples) and APSSDC, Hyderabad (7 samples) during *Rabi*, 2008-09; ten ODV samples of rice belonging to five varieties *viz.*, MTU-1061, MTU 1010, WGL-20471, Rathna and Lalath collected from Seed Testing Laboratory, Rajendranagar in *Rabi* 2009-10; and twenty two ODV samples of rice belonging to three varieties *viz.*, BPT 5204, MTU 1010 and Swarna collected from Seed Testing

Laboratory, APSSCA, Rajendranagar (9 samples) and Seed Testing Laboratory, APSSCA, Kadapa (13 samples) in *Rabi*, 2010-11 were subjected to grow-out test along with authentic (breeder seed) seed samples of respective varieties.

Observations recorded on ODV's based on rejected seed samples revealed variation in seed texture (shape, colour and size of seed) as against authentic breeder seed. However, field observations of ODV *vis-a-vis* control (breeder seed) progenies showed variation in distinguishable morphological DUS characters *viz.*, growth habit, anthocyanin pigmentation, foliage colour, flag leaf curvature, plant height, days to 50% flowering, panicle length and days to maturity.



ODV seeds in MTU 1010



ODV seeds in Tellahamsa

#### RESULTS AND DISCUSSION

Out of 25 seed samples, 14 lots have shown correctness of the identified ODV seeds in GOT

as off types during 2007-08. Eleven lots exhibited non correctness as true to type plants with a range of 1.43 to 4.84 % (Table 1). Per cent correctness ranged from 95.16 to 98.57%. In ADT 43 rice variety, out of 64 ODV seeds identified in the STLs, only 52 seeds germinated in the GOT field. Of these 52 plants, 50 plants exhibited correctness as offtypes while the remaining two plants exhibited non correctness i.e., two plants were identified as true to type plants.

Results of GOT conducted for 25 paddy ODV samples revealed that, eight lots exhibited 100% correctness as off type and the remaining 17 lots showed the correctness ranging from 85.37 to 98.77% i.e., these 17 seed lots were identified as true to type plants in 2008-09 (Fig. 1). The ODV samples sent by STL, APSSCA, Rajendranagar had shown correctness in the range of 85.37 to 98.77% while, the samples sent by STL, APSSDC, Hyderabad had shown correctness in the range of 97.27 to 97.50% (Table 2). Four out of seven (57%) seed lots sent by APSSDC, Hyderabad had shown 100% correctness of identified ODV seeds in GOT as offtypes and the remaining three seed samples (22.22%) sent by STL, Rajendranagar had shown 100% correctness.

During 2009-10, ten ODV samples of rice belonging to five varieties viz., MTU-1061, MTU 1010, WGL-20471, Rathna and Lalath, collected from Seed Testing Laboratory, Rajendranagar were subjected to grow-out test along with authentic (breeder seed) samples of respective varieties. The results indicated that out of 10 paddy ODV samples, two lots i.e., MTU 1061 and Lalath exhibited 100% correctness as off type and the remaining 8 lots showed the correctness ranging from 94.00 to 99.03% in GOT. Among the ten varieties, MTU 1061 and Lalath showed offtypes with the per cent correctness ranging from 94.00 to 99.03% while, the remaining eight seed lots of MTU 1010, WGL 10471 and Rathna were identified as true to type plants with non correctness ranging from 0.97 to 6.00% (Table 3 and Fig. 2).

Thirteen samples were collected from STL, APSSCA, Kadapa and 9 samples were collected during 2010-11 from STL, APSSCA, Rajendranagar. In the GOT test of 22 ODV seed

**Table 1: Validation of ODV seeds through GOT in Rice during Rabi, 2007-08**

S.No.	Variety	Identified ODV seeds in lab (no.)	Plant population in GOT (no.)	Correctness of ODV seeds as off-types (%)	Non correctness of ODV seeds in GOT as true plant type (%)
1	ADT 43	64	52	96.15	3.85
2	ADT 43	66	56	100.00	0.00
3	BPT 5204	50	45	95.56	4.44
4	BPT 5204	80	65	98.46	1.54
5	BPT 5204	68	57	98.25	1.75
6	IET 1444	70	62	95.16	4.84
7	IR 64	80	69	100.00	0.00
8	IR 64	75	63	100.00	0.00
9	IR 64	73	60	100.00	0.00
10	IR 64	66	57	100.00	0.00
11	IR 64	74	65	96.93	3.07
12	JGL 1798	78	70	98.57	1.43
13	JGL 384	70	62	100.00	0.00
14	KRH 2	76	66	100.00	0.00
15	MTU 1010	85	75	100.00	0.00
16	MTU 1010	104	90	95.56	4.44
17	MTU 1010	88	75	100.00	0.00
18	MTU 1010	76	65	98.46	1.54
19	Ratna	75	63	100.00	0.00
20	Ratna	70	60	100.00	0.00
21	Tellahamsa	71	63	98.41	1.59
22	Tellahamsa	64	56	100.00	0.00
23	Tulasi	70	58	98.28	1.72
24	WGL 20471	80	69	100.00	0.00
25	WGL 48684	100	87	100.00	0.00

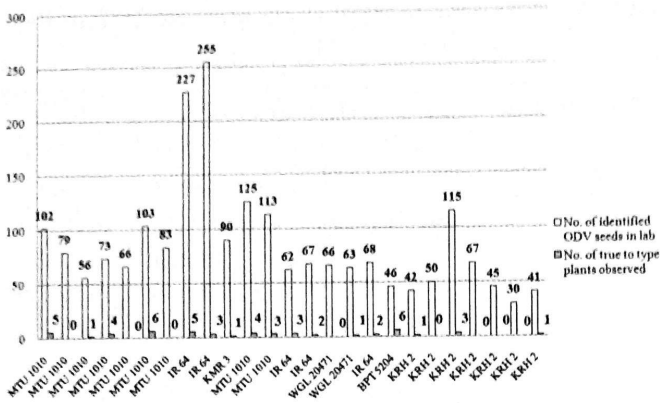


Fig. 1. Validation of ODV seeds through GOT in rice during Rabi, 2008-09

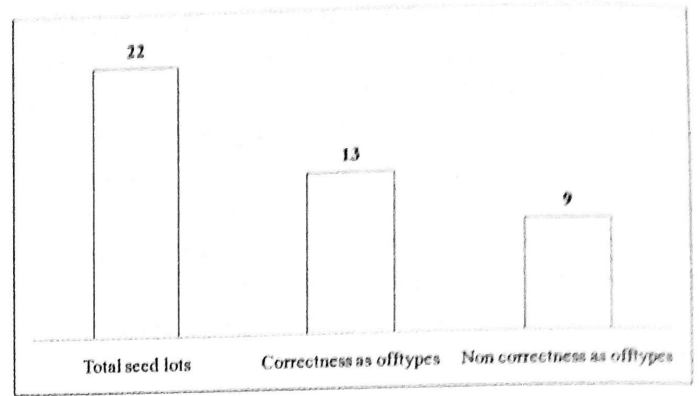


Fig. 3. Validation of ODV seed sample lots (22) through GOT in Rice during Rabi, 2010-11

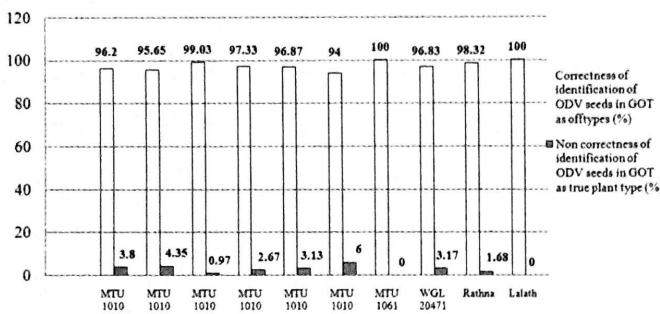


Fig. 2. Per cent validity of ODV seed lots (10) of rice during 2009-10. Source: C/S from STL, Rajendranagar

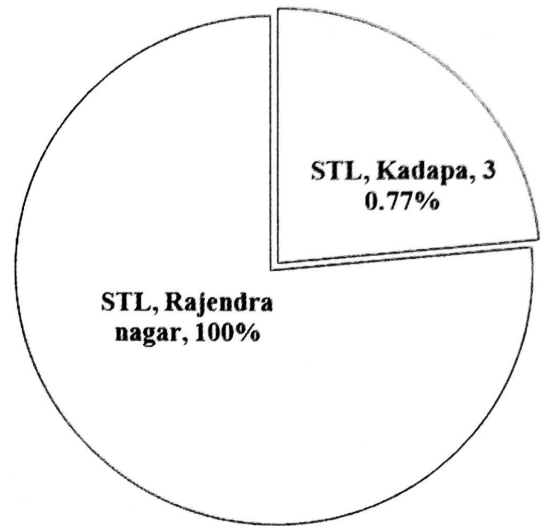


Fig. 4. Per cent validation of ODV seed lots submitted by STLs during Rabi, 2010-11

lots, 13 lots have exhibited 100% correctness as off type and rest of the 9 lots showed the correctness ranging from 60.0 – 92.31% (Table 4 and Fig. 3). Of the 13 lots which exhibited correctness, nine seed lots of Swarna from STL, APSSCA, Rajendranagar exhibited 100% correctness as offtypes, while the remaining four lots were from STL, APSSCA, Kadapa. 30.77% of the samples received from STL, Kadapa and 100% of the samples received from STL, APSSCA, Rajendranagar exhibited 100% correctness of ODV seeds in GOT as offtypes (Fig. 4).

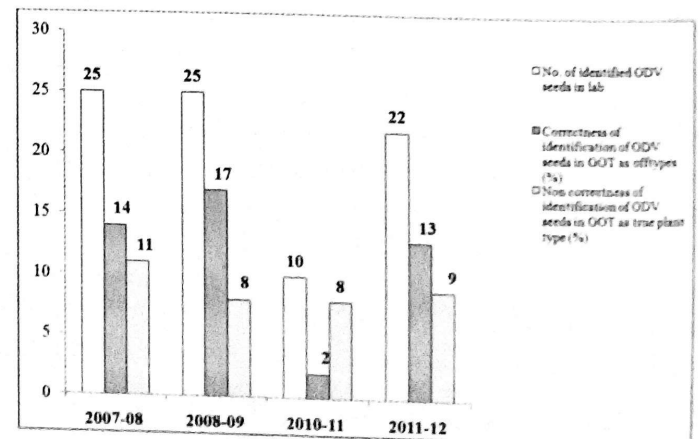


Fig. 5. Evaluation of total ODV seed lots in GOT over four consecutive years

Out of 82 total seed lots (Fig. 5), 46 lots exhibited correctness of ODV seeds as offtypes and the remaining 36 lots exhibited non correctness as true to types (Table 5 and Fig. 6). It was clearly indicated that 56.10% of the seed lots only exhibited correctness while, 43.90% of the seed lots exhibited non correctness (Fig. 7) and were declared as sub standard seed lots. It may result in loss to the producer in marketing

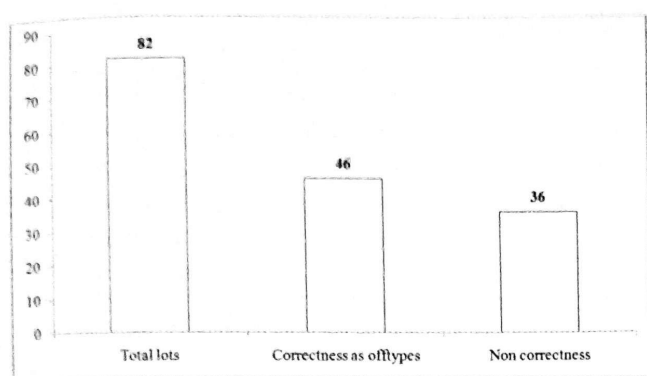


Fig. 6. Overall view of ODV seed sample lots submitted by STLs

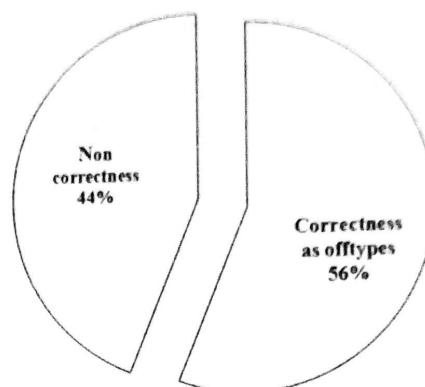


Fig. 7. Per cent validity of ODV seeds over a period of four years

Table 2. Validation of ODV seeds through GOT in Rice during Rabi, 2008-09

Lot No.	Variety	Class	Identified ODV seeds in lab (no.)	Plant population in GOT (no.)	True to type plants observed (no.)	Correctness of ODV seeds in GOT as offtypes (%)	Non correctness of ODV seeds in GOT as true plant type (%)
<b>STL, APSSCA, Rajendranagar</b>							
442	MTU 1010	C/S	102	91	5	94.51	5.49
443	MTU 1010	C/S	79	63	0	100.00	0.00
453	MTU 1010	C/S	56	51	1	98.04	1.96
454	MTU 1010	C/S	73	67	4	94.03	5.97
456	MTU 1010	C/S	66	64	0	100.00	0.00
458	MTU 1010	C/S	103	97	6	93.82	6.18
463	MTU 1010	C/S	83	68	0	100.00	0.00
716	IR 64	C/S	227	201	5	97.51	2.49
727	IR 64	C/S	255	231	3	98.70	1.3
743	KMR 3	F/S	90	81	1	98.77	1.23
1053	MTU 1010	C/S	125	121	4	96.69	3.31
1059	MTU 1010	C/S	113	108	3	97.22	2.78
2251	IR 64	C/S	62	56	3	94.64	5.36
2282	IR 64	C/S	67	61	2	96.72	3.28
3598	WGL 20471	C/S	66	63	0	100.00	0.00
3604	WGL 20471	C/S	63	62	1	98.39	1.61
4151	IR 64	C/S	68	66	2	96.97	3.03
8041	BPT 5204	F/S	46	41	6	85.37	14.63
<b>APSSDC, Hyderabad</b>							
30	KRH 2		42	40	1	97.50	2.50
41	KRH 2		50	48	0	100.00	0.00
45	KRH 2		115	110	3	97.27	2.73
67	KRH 2		67	61	0	100.00	0.00
15	KRH 2		45	39	0	100.00	0.00
50	KRH 2		30	30	0	100.00	0.00
42	KRH 2		41	40	1	97.50	2.50

Table 3: Validation of ODV seeds through GOT in Rice during Rabi, 2009-10

Lot No.	Variety	Identified ODV seeds in lab (no.)	Plant population in GOT (no.)	True to type plants observed (no.)	Correctness of ODV seeds in GOT as offtypes (%)	Non correctness of ODV seeds in GOT as true plant type (%)
9149	MTU 1010	85	79	3	96.20	3.80
9146	MTU 1010	97	92	4	95.65	4.35
9150	MTU 1010	115	103	1	99.03	0.97
9148	MTU 1010	200	187	5	97.33	2.67
9147	MTU 1010	68	64	2	96.87	3.13
8638	MTU 1010	102	100	6	94.00	6.00
8622	MTU 1061	49	46	0	100.00	0.00
8629	WGL 20471	69	63	2	96.83	3.17
8663	Rathna	124	119	2	98.32	1.68
8666	Lalath	39	36	0	100.00	0.00

Table 4: Validation of ODV seeds through GOT in Rice during Rabi, 2010-11

Lot No.	Variety	Identified ODV seeds in lab (no.)	Plant population in GOT (no.)	True to type plants observed (no.)	Correctness of ODV seeds in GOT as offtypes (%)	Non correctness of ODV seeds in GOT as true plant type (%)
<b>MTU 1010 (c)</b>			<b>Class : C/S</b>		<b>Source : STL, APSSCA, Kadapa</b>	
2735	MTU 1010	33	8	3	62.50	37.50
2734	MTU 1010	35	6	1	83.33	16.67
2737	MTU 1010	34	9	1	88.89	11.11
<b>BPT 5204 (c)</b>			<b>Class : C/S</b>		<b>Source : STL, APSSCA, Kadapa</b>	
693	BPT 5204	69	13	1	92.31	7.69
697	BPT 5204	64	7	0	100.00	0.00
698	BPT 5204	115	15	3	80.00	20.00
699	BPT 5204	90	7	0	100.00	0.00

700	BPT 5204	120	19	0	100.00	0.00
701	BPT 5204	111	22	0	100.00	0.00
704	BPT 5204	87	19	2	89.47	10.53
718	BPT 5204	96	5	2	60.00	40.00
719	BPT 5204	127	13	1	92.31	7.69
720	BPT 5204	93	13	2	84.62	15.38
<b>Swarna (c)</b>		<b>Class: C/S</b>		<b>Source : STL, APSSCA, Rajendranagar</b>		
9145	Swarna	80	21	0	100.00	0.00
4310	Swarna	167	20	0	100.00	0.00
4311	Swarna	78	1	0	100.00	0.00
4309	Swarna	122	23	0	100.00	0.00
4308	Swarna	107	18	0	100.00	0.00
4313	Swarna	83	12	0	100.00	0.00
4312	Swarna	109	21	0	100.00	0.00
4314	Swarna	98	20	0	100.00	0.00
4316	Swarna	96	17	0	100.00	0.00

**Table 5. Evaluation of total ODV seed lots in GOT over four consecutive years**

Year	Identified ODV seeds in lab (no.)	Correctness of ODV seeds in GOT as offtypes (%)	Non correctness of ODV seeds in GOT as true plant type (%)
2007-08	25	14	11
2008-09	25	17	8
2010-11	10	2	8
2011-12	22	13	9
Total	82	46	36
Percentage		56.10	43.90

as substandard lots. The present study revealed the requirement of perfect expertise, skill and

training for seed analysts of APSSCA, APSSDC and NSC in identification of ODV's in the seed testing laboratories which will further help in maintaining the genetic purity of basic seed and supply the quality seed to the farmers.

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