ADOPTION OF NEW RICE VARIETIES IN SRI LANKA

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Abstract

This study examined the adoption of newly released rice varieties and variety groups in the farmers' fields; measured the replacement rate of newly released varieties using data on varietal spread of RRDI database. Data showed that Bg 94-1, Bg 300 and Bg 352 are enduring varieties from 1970s ,1980s and 1990s respectively and Bg 358, Bg 359 and At 362 are widely planted new varieties. The new improved varieties released from mid 1960s were popularly planted with an observed decrease of the use of old improved varieties and traditional varieties. Replacement period of new rice varieties has declined over time and current replacement period is around 16 years with lower adoption rates of newly released rice varieties. While policy makers are encouraged to continually support and strengthen the current efforts of rice breeding research and extension, the policy of variety release and promotion needs to be strengthen focusing the emphasis on accessibility of seed and information on new varieties to farmers.

Key words: Adoption rate, replacement rate, rice variety

Introduction

Development of rice varieties is crucial for sustaining food security in Sri Lanka. Indeed, notable progress in rice production has been achieved over the last four decades through development and adoption of new improved varieties. The rice research system has been continuing the release of new rice varieties. By 2010, the Department of Agriculture (DOA) has released 67 rice varieties for different agro-ecological conditions. Evenson and Gollin (2003) viewed that varietal releases are not necessarily good measures of the success of varietal development programs: a better measure is the use of these varieties in farmers' fields. According to the paddy statistics (2009/10 *Maha*) published by the Department of Census and Statistics, about 98 percent of the country's rice area

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Is planned to new improved varieties released by the DOA, but these statistics have grouped all rice varieties released since 1968 into three categories and adoption trend of specific rice variety cannot be distinguished.

A more detailed understanding of the development and adoption trends by specific variety wise in farmers' fields is important because a relates to the impact of continued public plant breeding research program. Recent study by Jayawardena et.al (2010) assessed the adoption by variety wise and revealed that a higher percentage of total rice area is still occupied by varieties that were released more than 15 to 20 years ago. However, this study used the data only at particular point of time and change of adoption over time with release of new varieties has not been studied. Further, at the Provincial Working Group Meetings and Coordinated Rice Varietal Testing(CRVT) meeting of the DOA, it is often discussed that replacement of old varieties with new varieties is very slow and it is blamed to a weak research-extension linkage, less effective public sector extension system and the absence of seeds in adequate quantities of new varieties. However, to what extent farmers have been changing from the "old" varieties to the "new" ones, and the reasons for low level of replacement of old varieties with new varieties if the rate of replacement is low, are the issues that have not yet been rigorously studied.

In this context, it is useful to have an updated measure of the adoption trend of varieties and to the extent which farmers use these varieties. Adoption rates of new varieties indicate the impact of the breeding program that continues to develop and release new varieties on rice production in the country. Brennan and Byerlee (1991) indicated that "for a given rate of variety release, a rapid rate of variety replacement in farmers' fields leads to higher returns to public plant breeding research because the lag between variety release and adoption by farmers is reduced". This paper aims to analyze the adoption trends of released rice varieties and the rate of variety replacement in farmers' fields using the aggregate time series data set of the data base of the Rice Research and Development Institute (RRDI).

Methodology

Data

The study used data from the data base of the Rice Research and Development Institute (RRDI). This is the only time series data set available on rice varieties cultivated in Sri Lanka. The Department of Census and Statistic (DCS) publish data seasonally on rice cultivation but they are classified only to area harvested

to old improved varieties, new improved varieties and traditional varieties. One limitation of RRDI data is that "other variety category" which stands for varieties which are not identified by name represents substantial percentage (10%- 14%). This is possible when the farmers may not be able to identify variety by name correctly or recall the varieties they planted.

Analysis

Conceptually, a promising line undergoes a series of field performance tests and evaluation trials before it is released as a recommended variety. A promising line coming from preliminary and major yield trials conducted in the breeding station is subjected to National Coordinated Rice Varietal Testing (NCRVT) and Varietal Adoptability Testing (VAT) and Large Scale Varietal Adoptability Testing (LSVAT). The standard check varieties usually used are the best available existing variety. Therefore, newly released varieties are expected to perform similar to if not better than the existing varieties in the given environment for which it is recommended. When a farmer chooses to adopt a new variety in place of an older variety, it reflects the farmer's judgment that the new variety offers some net benefit or advantage (Evenson and Gollin, 2003). With this in mind, simple indices were calculated to understand more the dynamics of rice variety adoption, especially of the newly released varieties. Indices such as the proportion of recent varieties and weighted average age of varieties were calculated to determine the adoption rate of the newly released varieties following Brennan (1984) and Launio et.al (2008). The proportion of recent varieties is the proportion of the total area where are planted recently released varieties.

This index, q_{it}, is computed as follows:
$q_{it} = p_{it}$ if year of release $\geq t - m$,
$q_{it} = 0$ if year of release $< t - m$,
where p_{it} is the proportion of the area sown to variety, i, in year, t; m is the number of years used to define "recent." Then

$$I_t = \sum_i q_{it}$$

where I is the proportion of the total area that is sown to varieties released in the previous m years. In this study, it was assumed a lag period between the release of a variety and its availability to farmers is 2 years and recent variety is defined as a variety that is available to farmers for eight more years. The number of years used in this study to define "recent" is 10 years (m=10).

The weighted average age of varieties (following Brennan and Byerlee, 1991), on the other hand, consists of the weighted average age of varieties grown by farmers in a given year, measured in years from varietal release and weighted by the proportion of area each variety is sown at that time. This index, WA_t, is computed for a given year, t, as follows:

$$WA_t = \sum_i p_{it} R_{it}$$

where R_{it} is the age of the variety in terms of the number of years (at time t) since the release of variety i. This measure avoids the use of an arbitrary definition of "new" or "recent" varieties (Brennan and Byerlee, 1991). These indices (I and WA) were calculated at four points of time taking years; 1980, 1990, 2000 and 2009 as t. For year 2009, m =9. The oldest and newest varieties planted were also identified in the four points of time and it provided an additional indicator of the age of the varieties that are observed in farmers' fields.

Results and Discussion

Varieties released by the Department of Agriculture

The characteristics of the varieties released by the DOA are presented in Appendix 1 and 2. The number of varieties released in the 2000 decade was 12, compared to 18 in the 1990s, and 18 in the 1980s and 13 in 1970s. Of 67 rice varieties released, five varieties fall into 5-6 months age group, 23 into 4-4.5 month age group, 23 into 3.5 month age group, 14 into 3 months age group and two into 2.5 month age group. Varieties have been released by the DOA under two categories. The first category is for general cultivation. The second category is for specific region/problem soils/quality attributes. Out of 67 varieties, 32 varieties are for general cultivation and 35 varieties are for specific region/problem soils/quality attributes.

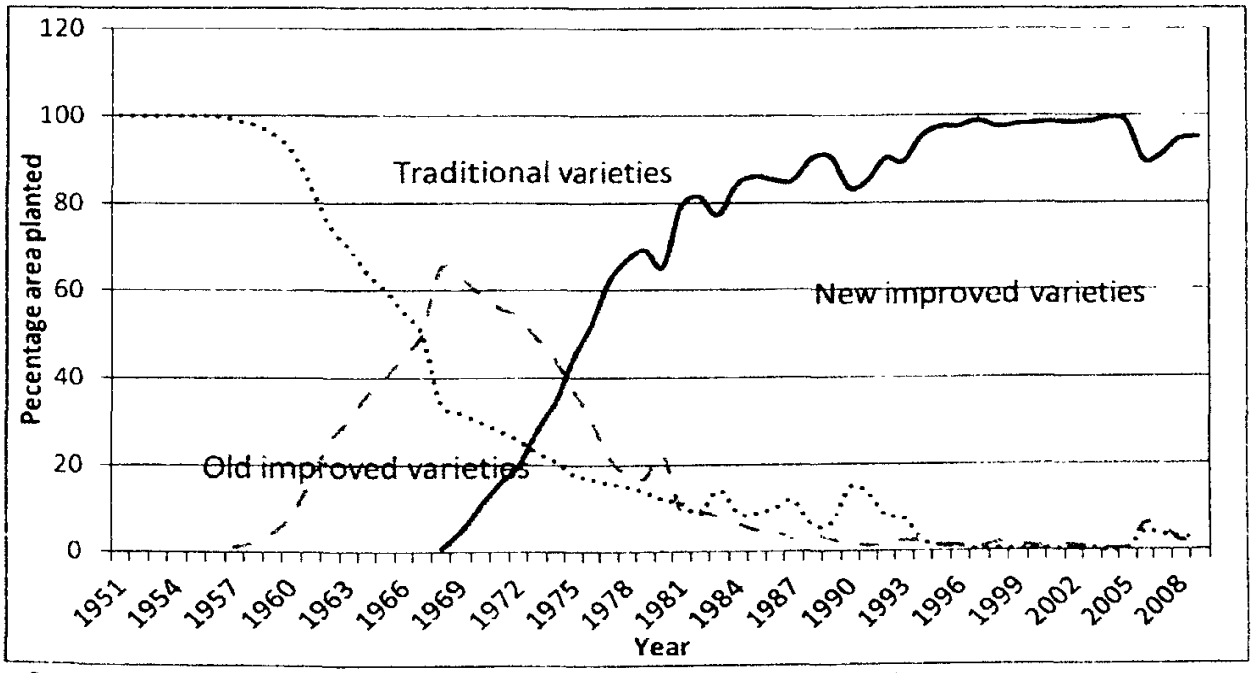
The potential yield of Bg 90-2 released in 1975 has not yet been surpassed by any new variety of that age group although five varieties of 4-4.5 months age group have been released for general cultivation after it. In addition, any new variety of this age group has not been released after 1993. For general cultivation, 13 varieties of 3.5 months age group have been released and of them, 7 varieties have been released after 1993. Of these seven varieties, six varieties surpassed potential yield of varieties released before 1993. Under 3 month age group, 10 varieties have been released for general cultivation. The yield of Bg 276-5 and Bg300 released in 1979 and 1987 respectively was

surpassed only by Bg 304 and Bg 305 released in 1993 and 1999, respectively. It appears that breeders have given the priority to develop short age variety in their breeding program recognizing the importance of water saving and demand of farmers for short age varieties.

Rice Varieties Cultivated by Farmers

The percentage of area planted with rice varieties based on major categories; Old Improved, New Improved, and Traditional are presented in Fig. 1. It did not take long for farmers to adopt New Improved Varieties (NIV). After their introduction in the end -1960s, more than 50% of the total rice area was planted with NIVs by 1978. This adoption rate steadily grew, and by 1984, around 95% of the rice area was planted with NIVs. The 2009 data showed that, almost 100% of the total rice area is cultivated with NIVs.

Figure 1: Percentage Area Planted by Categories of Rice Varieties (1951-2008)



Source: Paddy statistics (various issues), Department of Census and Statistics

The percentage areas planted by variety in different seasons at four points of time are presented in Table 3. The most popular varieties released in the 1970s were Bg 11-11, Bg 34-8 and Bg 94-1. Bg 94-1 and Bg 34-8 ranked first or second respectively until the 1990. By 2000, Bg 300, a 3 month variety released in 1987 was widely cultivated along with 3.5 month Bg 352 released in 1992 and Bg 94-1 released in 1975. Bg 300 still ranked first while Bg 352 released in 1992 and Bg 358 released in 1999 were also widely used in both seasons in 2009. Some

varieties have become popular to a considerable level certain level within a short period of time after their release and sometimes even before they are officially released. For example, Bg 300 released in 1987 has occupied 12 % of the total rice area by 1990 *yala* season. At 362 officially released in 2002 was reported in farmers field in 2000 *yala*. This is possible because seeds of new varieties are given to farmers for research purpose (VAT and LSVAT) before release and through these seeds those varieties are spread in farmers' fields.

Table 1: Percentage of Total Cultivated Extent by Variety and Season and the Year of Release for each Variety

Variety	Year release	79/80 Maha	80 Yala	89/90 Maha	90 Yala	99/00 Maha	00 Yala	08/09 Maha	09 yala
H 4	1958	0	0	3	0	1	0	0	0
Bg11-11	1970	24	4	5	1	1	0	0	0
Bg 34-8	1971	19	30	13	16	0	0	0	0
Bg 34-6	1971	8	9	4	3	1	0	0	0
Bg 3-5	1973	1	0	0	0	0	0	0	0
Bg 94-1	1975	17	28	23	27	10	11	8	9
Bg 90-2	1975	5	3	0	0	0	0	0	0
At 16	1977	1	1	0	0	0	0	0	0
BW 78	1977	1	1	0	0	0	0	0	0
Bg 94-2	1978	1	1	0	0	0	0	0	0
Bg276-5	1979	0	1	6	6	0	0	0	0
Bg379-2	1980	0	0	9	5	7	4	2	3
Bg400-1	1980	0	0	7	3	1	0	0	0
Bg272-6b	1981	0	0	2	3	0	0	0	1
Bw 266-7	1981	0	0	0	1	2	0	0	0
Bw 267-3	1981	0	0	1	2	1	2	0	0
Bg 380	1982	0	0	4	2	0	0	0	0
Bg 450	1985	0	0	5	1	8	1	1	0
Bg 350	1986	0	0	6	9	5	6	1	2
Bw 351	1986	0	0	3	5	3	3	1	0
Bg 300	1987	0	0	5	12	21	21	19	17
At 303	1990	0	0	0	0	1	1	1	1
Bg 352	1992	0	0	0	0	11	17	18	16
At 353	1992	0	0	0	0	5	9	3	3
At 354	1992	0	0	0	0	1	1	0	1
At 402	1992	0	0	0	0	1	0	1	0
Bg 304	1993	0	0	0	0	1	1	0	1

Bg 403	1993	0	0	0	0	5	2	2	1
LD 355	1994	0	0	0	0	5	5	0	1
LD 356	1994	0	0	0	0	2	4	2	4
Bg 357	1997	0	0	0	0	2	2	2	5
Bg 305	1999	0	0	0	0	0	0	1	1
Bg 358	1999	0	0	0	0	2	3	16	13
Bg 359	1999	0	0	0	0	0	0	5	7
Bg 360	1999	0	0	0	0	0	0	3	3
Bw 361	2002	0	0	0	0	0	0	1	1
At 362	2002	0	0	0	0	0	1	6	5
Bw 363	2003	0	0	0	0	0	0	0	1
At 307	2005	0	0	0	0	0	0	1	1

Note: Varieties with 0 values for all seasons were ignored. Since the area under other category can not be separated out into varieties falling into general cultivation and specific areas and varieties released for specific areas are cultivated in the areas where varieties released for general cultivation are cultivated all varieties were considered together in the calculation of percentage.
Source: Rice Research and Development Institute, Batalagoda

Adoption of New Rice Varieties and Replacement of Old varieties

The proportion of the total area planted to new rice varieties (varieties released in the previous 10 years from the time of point concerned) are presented in Table 2. In the 1979/80 *maha* and 1980 *yala*, varieties released during the period from 1970 to 1979 covered around 77 to 78 percent of the total rice area planted. In 1999/00 *maha* new rice varieties (varieties released during the period from 1990 to 1999) occupied only 33 percent of total rice area planted. In the 2000 *yala* season it was only 26 percent. This implies that rice varieties released before 1990 dominate in farmers' field even in 2000. On the other hand, it indicates the low rate of adoption of newly released varieties.

A close look at the weighted average age of varieties as an index of adoption rate of new varieties reveals a comparative in lower adoption of new rice varieties. The weighted average age of varieties planted has increased over time. This shows that replacement period of rice varieties have increased over time despite the high rate of release of new varieties. In 1980, it was 5 to 6 years. In 2009 it was 16 years. This implies a low rate of adoption of new varieties or low rate of replacement of old varieties with new varieties. This confirms the previous observation that higher percentage of rice area is planted to old varieties which was released before 10 years. The information on the old and new variety cultivated indicates that some varieties such as Bg 94-1 (1975), Bg 379-2 (1980), Bg 300 (1987) released more than 20 years ago are still cultivated by farmers.

Table 2: Indices of Adoption of New Varieties by Season

Season	Number of released varieties during the given period	Proportion sown to recent varieties ($I_{t\%}$)	Weighted average age of varieties ($WA_{i, Years}$)	New varieties (Varieties released during the previous 10 years from the time of point concerned)	Old Varieties (Varieties released 10 years prior to the time of point concerned)
1979/80 *maha*	13 (1970-1979)	77	6	Bg 34-8,Bg34-6, Bg 94-1,Bg 11-11 Bg 90-2, Bg 94-2, Bw78, At16,	
1980 *yala*	13 (1970-1979)	78	5	Bg 34-8,Bg34-6, Bg 94-1,Bg 11-11 Bg 90-2, Bg , 276-5 Bw78, At16,	
1989/90 *maha*	19 (1980-1989)	42	11	Bg 379-2, Bg400-1, Bg 350,Bg 450,Bg 300,Bg380 Bw 351, Bw 267-3	Bg 94-1,Bg 34-8,Bg 276-5,Bg 11-11, Bg 34-6, H4
1990 *Yala*	19 (1980-1989)	43	11	Bg 379-2, Bg400-1, Bg 350,Bg 450,Bg 300,Bg380 Bw 351, Bw 267-3	Bg 94-1,Bg 34-8,Bg 276-5, Bg 34-6,
1999/00 *maha*	18 (1990-1999)	33	12	Bg 352, Bg 403, Bg 358, Bg 357, Bg 304, At 353, At 303, At 354,Ld 355, Ld 356	Bg 300,Bg 94-1, Bg 450, Bg 379-2,Bg 350, Bw 351
2000 Yala	18 (1990-1999)	26	12	Bg 352, Bg 403, Bg 358, Bg 304, At 353, At 303, At 354,Ld 355, Ld 356	Bg 300,Bg 94-1, Bg 379-2,Bg 350, Bw 351
2008/09 *maha*	12 (2000-2008)	8	16	At 362, At 307, Bw 361	Bg 300, Bg 352,Bg 358, Bg 94-1,Bg 359, Bg 360, Bg 379-2, Bg 357,Bg 403,At 353, Ld 356,
2009 *yala*	12 (2000-2008)	8	16	At 362, At 307, Bw 361, BW 363	Bg 300, Bg 352,Bg 358, Bg 94-1,Bg 359, Bg 360, Bg 379-2, Bg 357,At 353, Ld 356,

Source: Authors' Calculation

Conclusions and Policy Implications

A progression in the use of New Improved Varieties is evident from the decreasing trend in the use of traditional and Old Improved Varieties and the increasing trend in the use of New Improved Varieties. This information can be used to encourage policymakers to continually support and strengthen the current efforts of public rice breeding research and extension. However, data showed that varieties (new improved) released more than 20 years ago are still planted in farmers' fields and there is also evidence of the slow rate adoption of newly released varieties.

On the adoption of new varieties, the study showed accounts of late adoption of new varieties. The replacement period of rice varieties in the country is increasing despite the high rate of release of new rice varieties. Does this reflect that in general, new varieties are inferior to the old ones? These findings should be considered in the policy of variety release and promotion, as it is possible that newly released superior varieties which may not have diffused yet will be crowded-out by more recent variety releases.

It is important that the seed network responsible for promoting new varieties be strengthened therefore, all new varieties would have at least been tried by farmers and taken its potential advantage before it will be crowded-out by varieties tested superior in other locations. The successful performance of new varieties in village demonstration sites, proper information flow of these successes, and the timely availability of certified and registered seed immediately after release must be ensured not to delay the diffusion of the variety. In addition, some farmers' selection varieties such as the case of Pokuru Samba are adopted in farmer fields even though it is not officially released. Thus, participatory breeding and consideration of farmers' selection as strategies for variety testing should continually be explored and pursued.

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Appendix Table 1: Characteristics, Year of Release and Pedigree of Rice Varieties Recommended for General Cultivation

Variety	Year of release	Pedigree	Maturity duration (days)	Higher yield recorded (t/ha)	Attributes
4-4.5 months					
H-4	1958	Murungakayan 302/Mas	135	4.5	Red pericarp,Resistant to BLB
H-8	1966	H-4/podiwee A8	135	4.5	White pericarp, Samba type, moderately resistant to BL
Bg 11-11	1970	Engkatek/H-8	135	6.5	Samba type
MI 273	1971	Gamma irradiated H-4	135		Red pericarp, resistant to BL
Bg 90-2	1975	IR 262/Remadja	120	8.5	High yield
Bg 400-1	1980	Ob678/IR20/H-4	130	8.5	Resistant to GM-1 and BB
Bg 379-2	1980	Bg96-3/ptb33	135	8.5	Resistant to BPH and BB
Bg 450	1985	Bg 12-1/IR42	130	6.0	Samba type, resistant to GM-1
Bw -452	1992	Honadarawala 502/c104	135	5.0	Red pericarp
Bg 403	1993	83-1026/Bg 379-2	120	8.0	White pericarp,resistant to BL,BLB
3.5 months					
H-7	1964	PP/Mas/H-5	105	3.5	Good grain quality
Bg 34-6	1971	IR8-246/PPP/Mas/H501	105	6.5	Red pericarp
Bg 94-1	1975	IR262/Ld66	105	8.5	White pericarp
Bg 94-2	1978	IR 262/Ld66	105	8.5	White pericarp
Bg 350	1986	Bg 94-1/Bg401-1/80-3717/Bg94-1	105	8.5	Red pericarp, resistant to GM-1
Bg 352	1992	Bg 380/Bg 367-4	105	6.0	White pericarp, resistant to BL and BPH
Bg 357	1997	Bg 797/Bg 300//85-1580/senerang M-17	106	9.5	Resistant to BPH, GM 1and 2 MR to thrips,R/MR to Blast, MR to (Iron toxicity)and low temperature White pericarp.L/M
Bg 358	1999	Bg-12-1/Bg 1492	105	9.5	Samba type, resistant to BL and BLB
Bg 360	1999	84-3346/IR36/Senerang	105	6.5	Good grain quality, resistant to GM I and II
Bw 361	2002	IR36/Bw267-3-11M	105	10.0	Red pericarp Moderately resistant to GM,BPH,BL
At 362	2002	At 85-2/Bg 380	105	10.0	Red pericarp, Moderately resistant to BLB,BPH,BL
Bw 363	2003	IR36/Bw267-3-11M	105	10.0	Moderately resistant to BLB,BPH,BL,GM
Ld 365	2008	Sel Ld 365	105	9.0	Red pericarp, Resistant to BPH,BL, Moderately resistant to GM

3 months					
H-10	1968	PP/Mas/H-5	90	3.0	Red pericarp
Bg 34-8	1971	IR246/pp/Mas/H-501	90	6.5	High yield
Bg 276-5	1979	Ob678/Bg 34-8	90	7.0	Resistant to GM-1
Bg 300	1987	Bg 367-7/IR 841/Bg 276-5	90	7.0	Resistant to GM-1, BPH,BL,BB
At 303	1990	At 66-2/Bg 276-5	90	5.0	Red pericarp, resistant to BL
Bg 304	1993	Co10/IR 50/84-1587/Bg 731-2	85	7.4	White pericarp, resistant to BPH,GM I and II, BL and BLB, good grain quality
Bg 305	1999	Bg 1203/Bg 1492	90	8.0	White pericarp, resistant to BPH,GM I and II, BL and BLB,
Variety	Year of release	Pedigree	Maturity duration (days)	Higher yield recorded (t/ha)	Attributes
At 306	2004	OB2273/At05	90	6.0	Basmathi grain quality Moderately resistant to BLB and GM, resistant to Blast and BPH
At 307	2005	Bg 2225-1/Bg 96-3298	90	7.0	White pericarp, resistant to BPH,RGM and Blast
At 308	2008	Bg 2225-1/Bg 2426-2	90	7.0	White pericarp, Samba type, Moderately resistant to BPH,BL,BLB, moderately susceptible RGM

Source: Rice Research and development Institute, Batalagoda

Appendix Table 2: Characteristics, Year Release and Pedigree of Rice Varieties Recommended for Specific Area/Problem Soils and Quality Attributes

	Year of release	Pedigree	Maturity duration (days)	Higher yield recorded (t/ha)	Attributes
5-6 month					
Specific area- Mawee Lands					
H-9	1968	C104/Mas/Panduruwee	150-180	3.5	Photoperiod sensitive
Bg 3-5	1973	Panduruwee/Mas/Engkatek	150-180	5.5	Photoperiod sensitive
Bg 407	1981	IR5/Panduruwee	150-180	7.5	Photoperiod sensitive, resistant to BB
Bg 745	1981	71-554/podiwee A8	150-180	6.0	Photoperiod sensitive, samba grain
Bg 38	1981	Engkatek//H-4/Podiwee A8	150-180	6.0	Photoperiod sensitive, samba grain
4-4.5 month					
For iron toxic and acidic soils In LCWZ					
Ld 66	1971	H-501/deo-Geo-Woo-gen	135	5.0	White pericarp
Bw 78	1977	H-501/Podiwee A8/H-5	135	5.0	White pericarp, samba grain Resistant to BL
Bw 100	1979	H-501/Podiwee A8/H-5	135	6.0	White pericarp, samba grain Resistant to BL
Bw 400	1987	Bw 259-3/Bw242-5-5	120	6.5	Red pericarp
Bw 451	1987	Bg 400-1/Bg 11-11	135	6.0	White pericarp
Bw 453	1992	IR2071-586/Bg 400-1	135	7.0	White pericarp, resistant to GM-1
At 401	1992	Bg 94-1/ Pokkali	120	5.0	Red pericarp
For dry and intermediate zone with assured water supply					
Bg 380	1982	Bg 90-2/Ob677	120	10.0	Resistant to GM-1
At 405	1997	At 402/Basmathi 442	120	5.6	Basmathi grain quality Moderately resistant to BPH
Bg 454	2005	MR 1523/87-519	128	9.0	White pericarp, resistant to GM, Moderately resistant to blast, BLB
Bg 407H	2005	Bg CMSIA*IR54742-22-19-3R	120	13.00	Hybrid, white pericarp, resistant to Blast, BPH, GM
For southern province					
At 402	1992	IR4432-52-6-4/Bg 90-2/76-3990/ob678	120	7.5	Red pericarp
For Northern Region					
Bg 406	2005	Bg 73-797/ptb33/ob678	120	7.0	Red pericarp, resistant to BPH
3.5 month					
For Southern Province					
At 16	1977	IR8/H-4	105		Red pericarp, resistant to BL
Ld 355	1994	Bw 451/IR50	105	4.5	Samba grain, resistant to BL,BLB

For iron toxic and acidic soils In LCWZ					
Bw 266-7	1981	BW242-5-5-5/ob677/Bg 90-2	105	4.5	White pericarp, resistant to GM-1
Bw 267-3	1981	Ld 125/Bw248-1	105	4.5	White pericarp, resistant to BL
Bw 351	1986	Bg 90-2/Bg 401-1	105	5.0	Red pericarp, Moderately resistant to sheath blight
Saline Area					
At 353	1992	Bg 94-1®/Bg 400-1//Bg 94-1	105	6.5	Red pericarp,MR to Blast and BB good for potential acid saline conditions found in Nilwala scheme
At 354	1992	Bg 94-1/Pokkali	105	5.0	White pericarp saline resistant , resistant to lodging
Kalutara & Galle District					
Ld 356	1994	Bw 451/Bw 351	100	4.5	Short round grain/moderately tolerant to iron toxicity resistant to seed spots and rice gall midge
Wet Zone					
Bg 359	1999	88-5089/Bg 379-2	105	7.0	Resistant to GM 1 and 11 BPH, BL moderately tolerant to iron toxicity
Low Country Wet Zone					
Bw 364 (Bw 1046)	2006	IR 36/Bw 267-3-11M	105	8.0	BPH-MR/MS,BL-MR,BLB-MR/MS,GM-R/MR
3 month Rainfed /Manawari					
62-355	1969	PP/H-5	90	3.0	Red pericarp, tolerant to drought
Low Country Wet Zone,(suitable for mineral half bog and bog soils)					
Bw 272-6b	1981	Bw 259-3/Bw 242-5-5	90	4.0	Red pericarp replacement for Herath Banda, Batapolai, resistant to BL, Resistant to lodging
Rainfed/Dry and Intermediate zone					
Bg 301	1987	1280/H-4	90	6.0	Red pericarp resistant to drought , BL and BB
Saline and Acid					
Bw 302	1987	Bw 259-3/Bw 242-5-5	90		Salinity and acid sulphate soils
2-2.5 month					
Low Country Intermediate Zone					
Bg 750	1981	Ainantsao//75-1870/pp	70	3.0	Ultra short maturity
Drought and Flooded area					
Bg 250	2002	Selection from farmers field	80	4.5	Ultra short maturity RGM-MR/ME,BPH-R/MR,BL-R/MS

Note: BL- Blast, BPH- Brown plant hopper, GM-I –Gall midge (Biotype I) PS- Photo sensitive
Source: Rice Research and Development Institute, Batalagoda