

ການສ້າງຖານຂໍ້ມູນ ສໍາລັບການປັບປຸງພັນເຂົ້າ ຢູ່ ສປປ ລາວ

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ບົດຄັດຫຍໍ້

ບູລິມະສິດຂອງການຄົ້ນຄວ້າທົດລອງເຂົ້າ ແມ່ນການປັບປຸງລະບົບການຄົ້ນຄວ້າທົດລອງ ແລະ ປັບປຸງພັນໃນປະຈຸບັນໃຫ້ມີຄວາມທັນສະໄໝ ເພື່ອສ້າງແນວພັນໃໝ່ ໃຫ້ມີຄວາມກະທັດຮັດ, ໃຊ້ເວລາໜ້ອຍ ແລະ ຕົ້ນທຶນຕໍ່າ ແຕ່ໄດ້ແນວພັນໃໝ່ ເປັນທີ່ຍອມຮັບຂອງຊາວນາ ດັ່ງນັ້ນ ການສ້າງຖານຂໍ້ມູນ ສໍາລັບ ວຽກງານປັບປຸງແນວພັນເຂົ້າ ຈຶ່ງເປັນກຸນແຈທີ່ມີຄວາມສໍາຄັນ ຕໍ່ກັບລະບົບການຄົ້ນຄວ້າທົດລອງ ເຊິ່ງຖານຂໍ້ມູນນີ້ ຈະຕອບສະໜອງຂໍ້ມູນທາງດ້ານວິທະຍາສາດ ໃຫ້ແກ່ນັກປັບປຸງພັນ ເພື່ອເປັນບ່ອນອີງໃນການສ້າງແນວພັນໃໝ່ ໃຫ້ມີຄວາມເໝາະສົມ ກັບແຕ່ລະເຂດນິເວດກະສິກໍາ. ວັດຖຸປະສົງຂອງການສ້າງຖານຂໍ້ມູນນີ້ ແມ່ນເພື່ອເຕົ້າໂຮມຂໍ້ມູນກ່ຽວກັບການຄົ້ນຄວ້າທົດລອງ ແລະ ປັບປຸງແນວພັນເຂົ້າ ກ່ອນປີ 2007 ແລະ ເພື່ອນໍາໃຊ້ຂໍ້ມູນດັ່ງກ່າວ ເຂົ້າໃນວຽກງານປັບປຸງແນວພັນເຂົ້າໃນປະຈຸບັນ ແລະ ອະນາຄົດ. ການຄົ້ນຄວ້າທົດລອງ ແລະ ປັບປຸງແນວພັນເຂົ້າ ທີ່ສູນຄົ້ນຄວ້າເຂົ້າ ແລະ ພຶດເສດຖະກິດ ໄດ້ລິເລີ້ມໃນປີ 1991 ເຊິ່ງໄດ້ຮັບການຮ່ວມມືກັບ ສະຖາບັນຄົ້ນຄວ້າເຂົ້າສາກົນ ໂດຍການໃຫ້ທຶນຈາກລັດທະບານປະເທດສະວິດສະເລນ. ນັບແຕ່ປີ 1991 ຫາ 1998 ສາຍພັນ ທີ່ເອົາເຂົ້າມາທົດສອບສ່ວນໃຫຍ່ ແມ່ນໄດ້ນໍາເຂົ້າມາຈາກ ສະຖາບັນຄົ້ນຄວ້າເຂົ້າ ສາກົນ ແລະ ໂຄງການຮ່ວມມື ໄທ-ອີຣີ. ໃນຈໍານວນ 1,127 ສາຍພັນ ຂອງລູກປະສົມ ລຸ້ນທີ 2 (F2) ທີ່ໄດ້ນໍາເຂົ້າມາທົດສອບ ຢູ່ ສູນຄົ້ນຄວ້າເຂົ້າ ແລະ ພຶດເສດຖະກິດ, 4 ສາຍພັນ ໄດ້ສົ່ງອອກສູ່ການຜະລິດໃນນາມຊື່ແນວພັນ ທ່າດອກຄໍາ ແລະ ໂພນງາມ. ໃນຈໍານວນ 64 ສາຍພັນຄົງຕົວ ທີ່ໄດ້ນໍາເຂົ້າມາທົດສອບ, 13 ສາຍພັນ ໄດ້ສົ່ງອອກສູ່ການຜະລິດໃນນາມ ຊື່ແນວພັນ ທ່າດອກຄໍາ, ທ່າສະໂນ, ໂພນງາມ ແລະ ນໍ້າຕານ. ການປະສົມພັນເຂົ້າ ຢູ່ ສູນຄົ້ນຄວ້າເຂົ້າ ແລະ ພຶດເສດຖະກິດ ໄດ້ເລີ້ມ ໃນປີ 1994 ແລະ ໄດ້ເຮັດການປະສົມພັນ ປະມານ 272 ຄູ່ປະສົມ, ໃນນັ້ນ 8 ຄູ່ປະສົມ ໄດ້ສົ່ງອອກສູ່ ການຜະລິດໃນນາມ ຊື່ແນວພັນ ທ່າດອກຄໍາ ແລະ ທ່າສະໂນ. 34 ສາຍພັນ ໄດ້ຄັດເລືອກເປັນສາຍພັນດີເດັ່ນ ເພື່ອຕຽມອອກສູ່ການຜະລິດ ໃນອະນາຄົດອັນໃກ້ນີ້. ລະຫວ່າງ ພໍ່ແມ່ພັນ ທີ່ນໍາໃຊ້ເຮັດການປະສົມພັນ ພົບວ່າ ເຂົ້າໜຽວທ່າດອກຄໍາ 1 ເປັນແນວພັນທີ່ໄດ້ນໍາໃຊ້ຫຼາຍທີ່ສຸດ.

ຄໍາສັບສໍາຄັນ: ປັບປຸງພັນເຂົ້າ, ເຂົ້າລູກປະສົມ, ແນວພັນ, ຊະນິດ, ສາຍປັບ, ພໍ່ແມ່ພັນ, ຖານຂໍ້ມູນ

¹ສູນຄົ້ນຄວ້າເຂົ້າ ແລະ ພຶດເສດຖະກິດ, ສະຖາບັນ ຄົ້ນຄວ້າ ກະສິກໍາ ແລະ ປ່າໄມ້ ແຫ່ງຊາດ

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DATA BASE ESTABLISHMENT OF RICE BREEDING PROGRAM IN LAOS

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Abstract

One of the national research priorities is to improve the efficiency of the current breeding and variety testing program in order to accelerate the introduction of better varieties for farmer's adoption. The database for the rice breeding is the key to achieve the breeding program and would provide valuable scientific information to improve the efficiency of the breeding program for target environments. The objectives of this database were to collect, document and utilize the available data from the national rice breeding program in Laos. Rice breeding program was established at Rice and Cash Crop Research Center in 1991, in collaboration with IRRI, and supported of funding by the government of Switzerland. From 1991 to 1998, most of the breeding lines were introduced from IRRI, Philippines and from Thai-IRRI program. Out of 1.627 lines of F₂ population, 4 lines were released as TDK and PNG varieties. Out of 64 imported promising lines, 13 lines were released as TDK, TSN, PNG and NTN varieties for different agro climatic zones in Lao PDR. Hybridization at RCCRC was started in 1994, since then, about 272 crosses were made by the Lao breeders. Out of 272 crosses made, so far 8 clones were released as TDK and TSN varieties and 34 lines were identified as promising lines. Among all parents used in the crossing program at RCCRC, TDK 1 was the dominant parent for evolving promising lines for Lao PDR.

Keywords: *Rice breeding, hybridization, variety, cultivar, promising line, parent, data base*

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INTRODUCTION

Since the rice breeding program started in late 1970s many crosses have been made. From 1992, population that were introduced from Thailand have been tested and selections made at Rice and Cash Crop Research Center (RCCRC). RCCRC has released a number of varieties for commercial adaptation. Some varieties were popular for some time and then disappeared from the varietal spectrum in Laos. The Lao breeders have identified the need of a database on the breeding program, and after consultation with the scientist from ACIAR project, initiated proper documentation of the breeding program in an electronic format.

One of the national research priorities is to improve the efficiency of the current breeding and variety testing program in order to accelerate the introduction of better varieties for farmer's adoption. This national electronic database would provide valuable scientific information to improve the efficiency of the breeding program for target environments.

The project aims to develop a comprehensive data base for rice breeding program in Laos. The data accumulated from different stages of the breeding program since 1991 up to 2007 was digitized and stored in the database and appropriate analysis was

conducted to develop the understanding of the progress of the current breeding program. Most of the rice breeding information was utilized for future rice breeding program and also the breeders and agronomists can understand the progress of the past varieties evaluation program and the efficiency of parents used to develop population in the past. Most of the database development work was conducted in the Rice and Cash Crop Research Center. Data was collected from Provincial Research Stations in Laos. The preliminary database developed by the ACIAR project CS1/1999/048 was used to continue the work.

Genetic analysis was conducted to understand the breeding values of different donors used for different populations and identify superior parent materials for future breeding work. There was an urgent need to develop a national database (electronic) for breeding and variety testing program in Laos. This will facilitate breeders to evaluate the progress of the previous breeding and varieties introduction programs in Laos. All previous data was stored in the database and that can be utilized by future breeding program.

The objectives of this database were to collect, document and utilize the available data from the national rice breeding program in Laos.

MATERIALS AND METHODS

A database system was developed for the Lao rice-breeding program. All important information on crosses from 1991 to 2007, progeny testing and variety performance from the different research centers have been entered into the database. The database uses a simple excel spreadsheet to record data from the rice breeding experiments in Laos. The data has been analyzed in order to quantify the performance of selected progenies based on their donor and recipient parents. The basic computer network has been developed at RCCRC using the funds provided by the LARF project. Two computers and one printers were allocated for compiling and analyzing data.

RESULTS AND DISCUSION

System of designation of TDK crosses

The system for designating crosses employs a slash (/) to indicate a single cross, two slashes (//) for a second cross, Three slash (///) for a thirth cross and so forth. The system of designation of the rice breeding program in Laos is based on the system used at International Rice Research Institute (IRRI).

Cross no	Symbol
1	/
2	//
3	///
4	/4/
5	/5/
n	/n/

For single cross, it would designated as

A/B

For three-way cross, it would designated as

A/B//C

For four-way (double) cross, it would designated as

A/B//C/D

Back crosses are designed by an asterisk (*) and a number indicating the contribution of the current parents. The asterisk and the number are placed adjacent to the crossing symbol, which divides the recurrent and donor parents. The following examples involve one backcross:

A is recurrent parent A*2/B

B is the recurrent parent A/2*B

A/B is the recurrent parent A/B*2C

C is recurrent parent A/B//2*C

TDK numbers and Pedigree record

TDK numbers and pedigree record are assigned consecutively to the crosses made at RCCRC, just before the hybrid seeds are incubated for germinations. When plants selection are made from F2 and subsequent generation of the TDK crosses, numerical designations are given for each breeding lines. For example, TDK10047-B-6-1-2 is a breeding line, was selected from the cross number 10047 which was designated as TDK10047, this cross made in dry season 1997-1998. The F2 population was grown as bulk with about 3.000 plants, which was designated as TDK10047-B. Plants selection from the F2 of this cross (numbering 300 plants) were grown in the pedigree nursery as F3 rows, which was consecutively designated as TDK10047-B-1, TDK10047-B-2, and so on up to TDK10047-B-300. From 300 lines of F2, row number 6 was selected, and planted in the pedigree nursery as F3 families and designated as TDK10047-B-6.

From selection of TDK10047-B-6, row number 1 was selected and planted in the pedigree nursery as F4 families, and designated as TDK10047-B-6-1. From selection TDK0047-B-6-1, two plants with in family were selected and designated as TDK10047-B-6-1-1 and TDK10047-B-6-1-2. At maturity, selection TDK10047-B-6-1-2 appeared uniform and

seeds of the entire row were bulk-harvested and used for yield evaluation in replicated trials and other tests. This line was evaluated in the lowland rice performance trial conducted by the rice varietal improvement group and basis of it superior performance, it was released as TDK11.

The system of the pedigree record of the rice breeding is depicted as below:

Parental lines: RD23/TDK5//TDK1
Cross designation: Three-way cross
Pedigree record: TDK10047 (F1)
 TDK10047-B (F2)
 TDK10047-B-6 (F3)
 TDK10047-B-6-1 (F4)
 TDK10047-B-6-1-2 (F5)

IR numbers and Pedigree record

IR numbers are assigned consecutively to the crosses made at IRRI, Philippines and Thai-IRRI. The IR lines were originated from IRRI and Thai-IRRI, and those lines were introduced to Laos from 1991 to 1998. Most of the IR lines were introduced from F2 population, pedigree (F3 to F7) and promising lines. All of breeding lines introduced were evaluated and selected by the rice breeders at RCCRC. The breeding lines which were evaluated and classified as promising lines at RCCRC, were sent for evaluation in the interstation and onfarm demonstration through out the country.

For example: IR71510-TDK-1-2-1 is a breeding line, was selected from the cross IR71510, made between IR43070-UBN-501-2-1-1-1/RD6//RD6. The F1 population was designated as IR71510. Plants selection from F2 of this cross (30 lines) were selected by Lao breeders and grown in the pedigree nursery as F2 population at RCCRC, which were consecutively designated as IR71510-TDK-1, IR71510-TDK-2, IR71510-TDK-30. From 30 lines, row number 1 was selected with 2 plants, and grown as F3 family and designated as IR71510-TDK-1-1 and IR71510-TDK-1-2. From selection IR71510-TDK-1-2, row number 1 was selected and planted in the pedigree nursery as F4 family, and designated as IR71510-TDK-1-2-1. This line was appeared uniform and seeds of the entire row were bulk-harvested and used for yield evaluation in replicated trials and other tests. This line was evaluated in the lowland rice performance trial conducted by the rice varietal improvement group and basis of its superior performance, was released as TDK9.

The system of the pedigree record of the rice breeding is depicted as below:

Parental lines: IR43070-UBN-501-2-1-1-1/RD6//RD6

Cross designation: Three-way cross

Pedigree record: IR71510 (F1)

IR71510-TDK-1 (F2)

IR71510-TDK-1-2 (F3)

IR71510-TDK-1-2-1 (F4)

IR crosses introduced to Laos since 1991

From 1991 to 1998, most of the breeding lines evaluated at RCCRC for yield, insect and disease resistant and other agronomic characters were introduced from IRRI and Thai-IRRI. Since then, about 1,627 lines of F2 population derived from 54 crosses; 935 lines of F3 family derived from 29 crosses; 202 lines of F4 family from 23 crosses; 239 lines of F5 family derived from 30 crosses; 124 lines of F6 family derived from 21 crosses and 162 lines of F7 family derived from 27 crosses were introduced and evaluated at RCCRC (Annex 1, 2, 3, 4, 5, 6). Out of the lines introduced from IRRI and Thai-IRRI, three lines were released as TDK varieties (TDK6, TDK7 and TDK9), these varieties were selected from F2 population and one line was released as PNG variety (PNG5), this variety was also selected from the F2 population. These results showed that, an introduction of F2 population for screening and evaluating in the country was successful and have progressed more than the other population (F3 to F7), due to F2 population has higher variation and viability within population, therefore, it can adapt

to the new environment, while the other population (F3 to F7) have lower variation, so it might not adapt to the new environment, therefore, there are no any line come from F3 to F7 can be selected and released.

In 1991, about twentyfive promising lines introduced from IRRI and Thai-IRRI, were evaluated at RCCRC and other Research Centers by conducting primery yield trial and following by the replicated yield trial. Out of 25 promising lines, two lines were selected and released as TDK varieties (TDK1 and TDK2), one line was released as TSN vareity (TSN1) and one line was released as PNG variety (PNG1) (Annex 7). In 1993, twenty-two promising lines were introduced and evaluated at RCCRC and other Research Centers. Out of those lines, two lines were released as TDK varietie (TDK4 and TDK10) and one was released as NTN variety (NTN1) (Annex 8). In 1994, seventeen promising lines were introduced and evaluated at RCCRC and other research center. Out of those lines, two promising lines were released as PNG varieteis (PNG4 and PNG6) (Annex 9). Results of these research shows that, an introduction of promising lines for sreening and evaluating in the country is an option of the breeding program to save time, labors and budget for development of the new cultivars.

Crosses made by Lao Breeders in Lao PDR.

Before 1994, rice hybridization was made at Salakham Rice Research Center and the disignation was asigned a number with SK as a prefix, therefore, the first cross made between Sanpatong/IR848-120 was designed as SK1. The following crosses was made between Mae Hang/IR2823-103 was designed as SK2, the cross between IKao/IR2823-103 was designed as SK3 and so on upto SK12, which was cross between RD10/B1014. Since 1994, all crosses were made at RCCRC and the designation was assigned as a number with TDK (the location of the Research Center, Tadokkham village, Saythany district, Vientiane capital) as a prefix. Thus, the first cross made in 1994 between Dok Tiou/TDK1 was designed as TDK94017, the subsequent crosses between Nang Nouane/TDK1 was given consicutive number as TDK94018 and TDK94019 (IR43070-UBN-507-2-1-1/RD6). In 1995, the crosses made were designe as TDK95001 (TDK1/IR65) and TDK95002 (PNG1/TDK1). Since 1996, the crosses made were designed as TDK10020 (IR57514/TDK1) and the subsequent crosses were given consicutive number, such as TDK10021 (IR57514/TDK1//TDK1), TDK10022 (Meng Nga/IR253-100) and so on. As in 2007, crosses have made at RCCRC were asigned

as TDK10302. Based on the objectives of the rice breeding program, 272 crosses were made from 1994 to 2007 at RCCRC. About 138 (51%) of the parents used to make the crosses were applied waxy by waxy, 127 (47%) were waxy by non-waxy and 7 (2%) were nonwaxy by non waxy. About 220 (80%) of the methods used to make hybridization was applied single cross method and about 52 (20%) was applied three way-cross and back cross methods. About 155 (57%) of the crosses made were bred for irrigated environment (used nonphotoperiod, semidwarf improved cultivars) and about 117 (43%) of the crosses made were bred for both rainfed and irrigated environment (used both improved semidwarf and traditional/landrace cultivars (Annex 10).

From the crosses made by Lao rice breeders, tree crosses were selected and released as TDK varieties (TDK5, TDK8 and TDK11). Five crosses were selected and release as TSN varieties (TSN2, TSN3, TSN4, TSN5 and TSN6). This results show the progress of the genetic improvement of the rice breeding program in Laos, which is running by the Lao breeders since 1994.

Thadokkham (TDK) varieties

TDK1 was the first cultivar named by RCCRC and released in 1993. This cultivar was selected from the cross between

SPT77149/IR13423-10-2-3, made by Thai-IRRI. It was tested under the experimental designation of IR43069-UBN-507-3-1-2-2. Subsequent TDK varieties were selected from IR and TDK crosses such as: TDK2 was selected from the cross between IR2061-214-14-8/RD1, this cross was introduced from Thai breeding program with designation of IR KKNLR75051-PMI-65-3-1-1. TDK3 was introduced from Vietnam Agriculture University No 1, with designation of L161-7-3-1. TDK4 was selected from the cross between SPT149-429-3/IR21848-65-3-2, this cross was introduced from Thai-IRRI, with designation of IR43070-UBN-501-2-1-1-1. TDK5 was selected from cross between RD10/B1014, this is a first cross made by the Lao rice breeder, with designation of SK12-117-2-3. TDK6 was selected from the cross between IR54081-CPA-3-B-1-3/IR41110-B-B-43//SLK3-1-2-2, this cross was introduced from Thai-IRRI, with designation of IR70824-TDK-5-B-1. TDK7 was selected from the cross between IR63943-25-B-1/IR55810-UBN-1-1-2-1-1, this cross was introduced from Thai-IRRI, with designation of IR68101-TDK-B-B-31-1. TDK8 was selected from the cross between RD10/TDK1, this cross was made by the Lao rice breeding program, with the designation of TDK10037-B-3-2-1-B. TDK9 was selected from the cross between

TDK4/RD6//RD6, this cross was introduced from Thai-IRRI, with designation of IR71510-TDK-1-2-1. TDK10 was selected from Thai-IRRI cross, with designation of BKNLR78015-R-R-RPSL3-1. TDK11

was selected from the cross between RD23/TDK5//TDK1, this cross was also made by Lao rice breeding program, with designation TDK10047-B-6-1-2 (Table 1).

Table 1: TDK varieties.

Name of Varieties	Designation	Parents	Type of endosperm	Year released	Target environment	Source
TDK1	IR43069-UBN-507-3-1-2-2	SPT77149/IR13423-10-2-3	Waxy	1993	Irrigated	Thai-IRRI
TDK2	IR KKNLR75051-PMI-65-3-1-1	IR2061-214-14-8/RD1	Waxy	1993	Irrigated	Thai
TDK3	L161-7-3-1	-	Waxy	1997	Irrigated	Vientname
TDK4	IR43070-UBN-501-2-1-1-1	SPT149-429-3/IR21848-65-3-2	Waxy	1998	Rainfed	Thai-IRRI
TDK5	SK12-117-2-3	RD10/B1014	Waxy	2000	Irrigated	Laos
TDK6	IR70824-TDK-5-B-1	IR54081-CPA-3-B-1-3 /IR41110-B-B-43//S LK3-1-2-2	Waxy	2003	Irrigated	Thai-IRRI
TDK7	IR68101-TDK-B-B-31-1	IR63943-25-B-1/IR 55810-UBN-1-1-2-1-1	Waxy	2003	Irrigated	Thai-IRRI
TDK8	TDK10037-B-3-2-1-B	RD10/TDK1	Waxy	2005	Irrigated	Laos
TDK9	IR71510-TDK-1-2-1	TDK4/RD6//RD6	Waxy	2006	Rainfed	Thai-IRRI
TDK10	BKNLR78015-R-R-RPSL3-1	BKN6721-7-1-5/RD6	Waxy	2007	Rainfed	Thai
TDK11	TDK10047-B-6-1-2	RD23/TDK5//TDK1	waxy	2008	Irrigated	Laos

Thasano (TSN) varieties

Thasano Rice Research Center (TSN) – the name of the rice research and seeds multiplication center, Khanthaboury district, Savannakhet province. TSN1 was the first cross released as TSN variety, this variety was selected from the cross between NSPT/IR21015-80-3-3-1-2, made by Thai-IRRI, with designation of IR46463-CPA-5-2-1-1 (Table 2). TSN2 was selected from the cross between I-Khao/IR57514-PMI-5-B-1-2, this cross was made by Lao rice breeders at RCCRC, with designed of TDK10026. The F2 population was growth and selected at TSN, with designation number of TDK10026-TSN-B-132-2-1. TSN3 was selected from the cross between IKao/

TDK1, this cross was also made by Lao rice breeder at RCCRC and F2 population was growth and selected at TSN, with designation of TDK10027-TSN-B-111-5-1. TSN4 selected from the cross between IR43070-UBN-507-1-2-2-1/IR57514-PMI-5-B-1-2, this cross was made at RCCRC, by Lao rice breeders and F2 population was growth and selected at TSN, with designation of TDK10030-TSN-B-123-3-3. TSN5 was selected from the cross between IR68/RD10, made at RCCRC by Lao rice breeders and F2 population was growth and selected at TSN, with designation of TDK10099-TSN-B-154-2-2-3. TSN6 was selected from the cross between TDK5/IR43070-UBN-507-1-2-2-1, made at RCCRC by Lao

Table 2: TSN varieties.

Name of Varieties	Designation	Parents	Type of endosperm	Year released	Target environment	Source
TSN1	IR46463-CPA-5-2-1-1	NSPT/IR21015-80-3-3-1-2	Waxy	1998	Irrigated	Thai-IRR
TSN2	TDK10026-TSN-B-132-2-1	IKAO/IR57514-PMI-5-B-1-2	Waxy	2004	Irrigated	Loas
TSN3	TDK10027-TSN-B-111-5-1	IKAO/TDK1	Waxy	2004	Irrigated	Loas
TSN4	TDK10033-TSN-B-123-3-3	TDK4/IR57514-PMI-5-B-1-2	Waxy	2004	Irrigated	Laos
TSN5	TDK10099-TSN-B-154-2-2-3	IR68/RD10	Waxy	2008	Irrigated	Laos
TSN6	TDK10093-TSN-2-1-1	TDK5/IR43070-UBN-507-1-2-2-1	Waxy	2008	Irrigated	Laos
TSN7	IR70224-23-1-1-TSN-2-1-1	IR60297-MI-108-1-3-1/IR49746-UBN-3-B-3-1	Waxy	2008	Irrigated	Thai-IRRI

rice breeders, and F2 population was grown and selected at TSN, with designation of TDK10093-TSN-2-1-1. TSN7 was selected from the cross between IR60297-PMI-108-1-3-1/IR49746-UBN-33-B-3-1, made at Thai-IRRI, with designation of IR70224-23-1-1-TSN-2-1-1.

Phone Ngam (PNG) varieties

Phone Ngam Rice Research Center (PNG) – the name of the rice research and seeds multiplication center, Pakse district, Champasak province. PNG1 was selected from the cross between UBN6721-13-5-6/IR19660-73-4-2, this cross was made at Thai-IRRI, with designation of IR43086-

UBN-505-2-3-1 (Table 3). PNG2 was selected from the cross IR626/Niaw Sanpatong, made at Thai National Research Program. PNG3 was selected from the cross between IR60290-CPA-1-2-1-1-3/IR57519-PMI-5-2//IR57458-PMI-17-B-1-1, made at Thai-IRRI, with designation of IR68835-44-8-B-PNG-B. PNG5 was selected from cross between IR63943-25-B-1/IR57530-UBN-9-1-1, made at Thai-IRRI, with designation of IRIR68012-TDK-B-B33-1. PNG6 was selected from cross between IR49733-SRN-5-B-1-2/MALAGKIT SONG SONG//IR54081-CPA-2-B-1-2, made by Thai-IRRI, with designation of IR70199-1-1-1-1-1.

Table 3: PNG varieties.

Name of Varieties	Designation	Parents	Type of endosperm	Year released	Target environment	Source
PNG1	IR43086-UBN-505-2-3-1	UBN6721-13-5-6/ IR19660-73-4-2	Waxy	1993	Irrigated	Thai-IRRI
PNG2	-	IR626/NIW SANPATONG	Waxy	1995	Irrigated	Thai-IRRI
PNG3	IR68835-44-8-B-PNG-B	IR60290-CPA-1-2-1-1-3/ IR57519-PMI-5-2// IR57458-PMI-17-B-1-1	Waxy	2005	Irrigated	Thai-IRRI
PNG5	IR68012-TDK-B-B33-1	IR63943-25-B-1/ IR57530-UBN-9-1-1	Waxy	2005	Irrigated	Thai-IRRI
PNG6	IR70199-1-1-1-1-1	-SRN-5-B-1-2/MAL AGKIT SONG SONG// IR54081-CPA-2-B-1-2	Waxy	2005	Irrigated	Thai-IRRI

Namthane (NTN) varieties

Namthane Rice Research Center (NTN) - the name of the location of rice research and seeds multiplication center, Phiang district, Sayaboury province. NTN1 was selected from the cross between NSPT/KKN7409-SRN-501//IR19431-72-2, made at Thai-IRRI with designation of IR49766-KKN-52-B-2-3. It was introduced to Laos in 1993 for evaluating at RCCRC, this line was promising and selecting for multilocation test and it was released in 1998.

Genetic improvement and promising lines developed by Lao breeders at RCCRC

All of the cultivars released by the National Rice Breeding Program before 2007 were waxy rice, due to the objectives of the rice breeding program in Laos was based on development of waxy rice. About 12 crosses made at Salakham Rice Research Center, one cross was released as TDK variety (TDK5). From 272 crosses made at RCCRC, two crosses were released as TDK varieties (TDK8, TDK11) (Table 1). 5 crosses were released as TSN varieties (TSN2, TSN3, TDN4, TSN5, TDN6) (Table 2). 34 lines derived from 30 crosses which were bred at RCCRC were identified as promising lines (Table 4).

From 272 crosses made at RCCRC, TDK1 (high yield simidwaft cultivar, wide adaptability to lowland environment, resistance to BPH, high response to nitrogen, photoperiod nonsensitive) was applied for both donor and recipient parent of about 92 crosses and it take about 33,8% of the total crosses (Table 5). Out of 92 crosses, 3 crosses (3,26%) were released as varieties and 21 crosses (23%) were identified as promising lines. TDK3 (high yielding simidwaft cultivar, suitable for fertile soil, resistance to PBH, good milling quality, photoperiod nonsensitive) was applied as the parental line of about 24 crosses and it take about 8,8% of the total crosses. Out of 24 crosses, 2 crosses (8,3%) were identified as promising lines. IR253-100 (sturdy culms, wide adaptability, big grain, drought tolerance, photoperiod nonsensitive) was applied as the parental line of about 20 crosses and it take about 7,3% of the total crosses. Out of 20 crosses, 2 crosses (10%) were identified as promising lines. RD10 (photoperiod nonsensitive, good milling and eating quality) was applied as the parental line of about 16 crosses and it take about 5,8% of the total crosses. Out of 16 crosses, 3 crosses (18,75%) were released as varieties, 3 crosses (18,75%) were identified as promising lines. Thus RD10 is the most successful parent in terms of the proportion

of crosses producing released varieties and promising lines. TDK5 (short growth duration, photoperiod nonsensitive, good eating and milling quality, good adaptability to high elevation in northern Laos) was applied as the parental line of about 16 crosses and it takes about 5,8% of the total crosses. Out of 16 crosses, 1 cross (6,25%) were released as varieties, 2 crosses (12,5%) were identified as promising lines. While the number of crosses made was rather small, high yielding drought resistant line IR57514-PMI-5-B-1-2 produced 3 promising lines.

In 2001 the PYT was conducted at RCCRC in the WS and again at RCCRC in the 2001/02 DS (Figure 1). The best lines are selected for inclusion in the variety release program. Data for grain yield is available only for the entries in the PYT. The variety, TDK1 was also a recipient for the cross number TDK10036. The donor parents for TDK10043, TDK10044 and TDK10074 were TDK 3. In summary, most of the

selections for PYT were derived from either TDK1 or TDK3. This again indicates that TDK1 has been the dominant donor parent in the Lao national breeding program since 1992. The electronic database is useful for Lao breeders to make quick reference of previous crosses. The database also helps to identify successful donors and recipient for the future breeding program.

Table 4: Promising lines and varieties developed from crossing at RCCRC.

No.	Varieties name	Lines	Parental used	Remark
1		TDK10025-B-14-3-B	MAK HING/TDK1	Waxy
2		TDK10027-67-1-1-B	I KAO/TDK1	Waxy
3		TDK10027-1-1-B-SK-B	I KAO/TDK1	Waxy
4		TDK10032-B-130-6-2-9	TDK4/TDK1	Waxy
5		TDK10032-B-1-1-2	TDK4/TDK1	Waxy
6		TDK10033-21-1-1-9-B	TDK4/ IR57514-PMI-5-B-1-2	Non waxy
7		TDK10034-B-51-1-1	RD6/TDK1	Waxy
8		TDK10036-B-150-20-7-6	TDK1/IR65	Waxy
9		TDK10037-B-21-1-2-1	RD10/TDK1	Waxy
10		TDK10037-B-3-2-2-1	RD10/TDK1	Waxy
11		TDK10047-B-6-1-2-B	RD23/TDK5//TDK1	Waxy
12		TDK10049-6-3-8	RD10/PSBRC10	Waxy
13		TDK10061-98-B-2-50-B	IR253-100/RD6	Waxy
14		TDK10078-B-104-3-1	TDK5/TDK1	Waxy
15		TDK10078-B-22-2-1-1	TDK5/TDK1	waxy
16		TDK10104-B-88-2-1	RD23/TDK2//TDK1	Waxy
17		TDK10109-4B-2B-B-B	TDK2/CR203//TDK5	Waxy
18		TDK10123-4-B-34-B	RD16 (LOCAL)/TDK1	Waxy
19		TDK10128-1-2-2-B-B1	IR36/IR43070-UBN-507-1-2-2-1// TDK3	Waxy
20		TDK10155-B-B-49-3-B	RD15/IR253-100	Waxy
21		TDK10161-B-B-39-7-B	RD15/TDK3	Non waxy
22		TDK10191-9-B-B-B-1-B1	TDK1/ RD6	Waxy
23		TDK10192-2-B-2-B	TDK1/ TDK7	Waxy
24		TDK10198-21-B-1-B	TDK47-B-8-6-1-2-3-B/CHAO AMERICA	Waxy
25		TDK10221-7-7-B-B	TDK1/TDK7// MEUANG NGA	Waxy
26		TDK10223-3-3-B-B	TDK1/TDK5// I KAO	Waxy
27	TDK5	SK12-117-2-3	RD10/B1014	Waxy
28	TDK8	TDK10037-B-3-2-1-B	RD10/TDK1	Waxy
29	TDK11	TDK10047-B-6-1-2	RD23/TDK5//TDK1	Waxy
30	TSN2	TDK10026-TSN-B-132-2-1	IKAO/IR57514-PMI-5-B-1-2	Waxy
31	TSN3	TDK10027-TSN-B-111-5-1	IKAO/TDK1	Waxy
32	TSN4	TDK10033-TSN-B-123-3-3	TDK4/IR57514-PMI-5-B-1-2	Waxy
33	TSN5	TDK10099-SN-B-154-2-2-3	IR68/RD10	Waxy
34	TSN6	TDK10093-TSN-2-1-1	TDK5/IR43070-UBN-507-1-2-2-1	Waxy

Table 5: Common parental lines used in the hybridization.

No.	Varieties name	Number of crosses	Number of varieties	Number of promising
1	TDK1	92	3	21
2	TDK3	24	-	2
3	IR253-100	20	-	2
4	RD10	16	3	3
5	TDK5	16	1	2
6	RD6	13	-	4
7	IR43070-UBN-507-1-2-2-1	13	-	2
8	RD23	11	-	3
9	MEUANGNGA	11	-	1
10	CR203	10	-	-

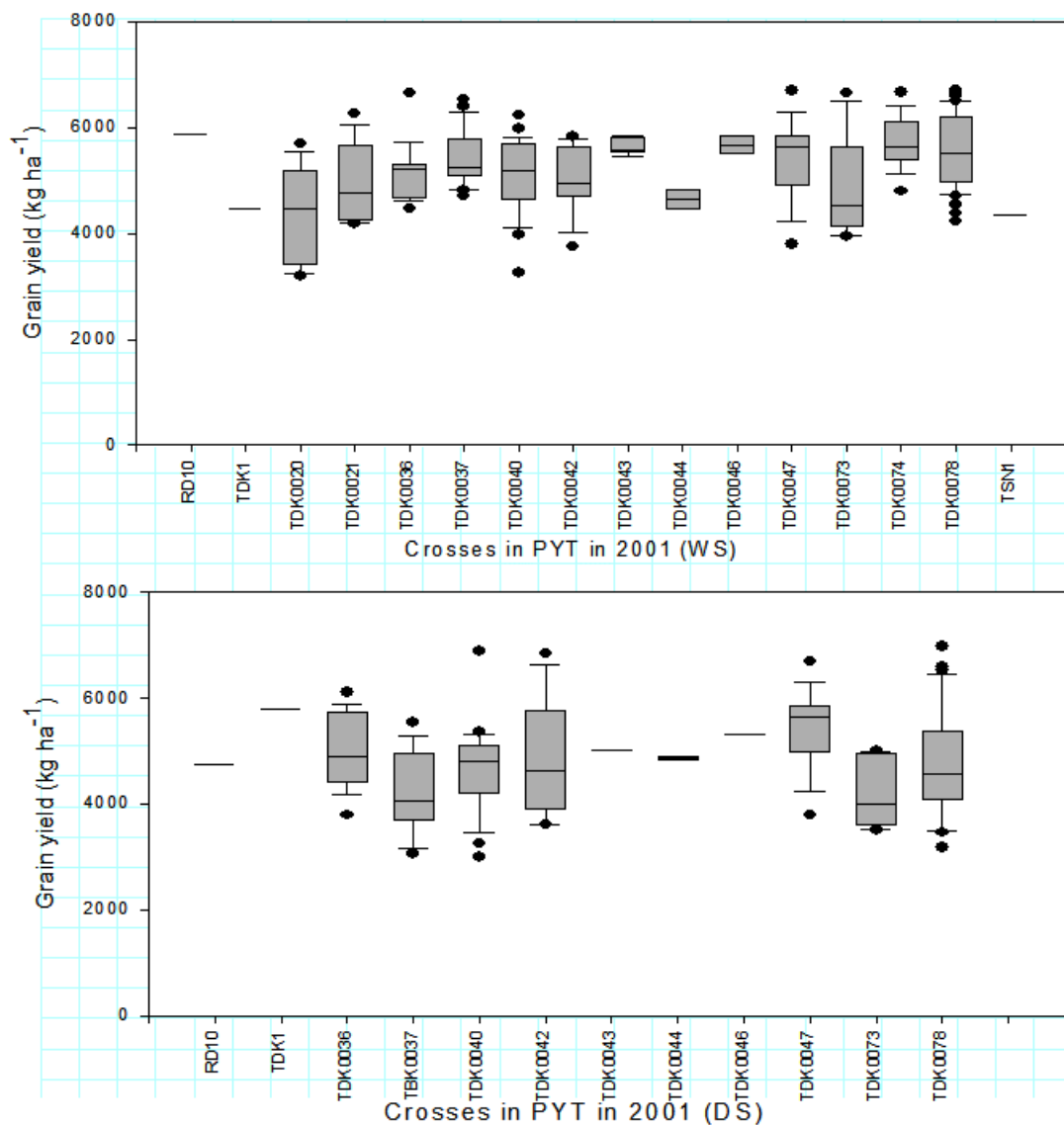


Figure 1: Grain yield variations (WS and DS experiments) within crosses in 2001 PYT for the crosses made since 1997. Cross bar within the box shows the mean of each population, upper and lower limits (95% level) and outliers (●)

CONCLUSION AND RECOMMENDATION

Rice breeding program was established at Rice and Cash Crop Research Center in 1991, in collaboration with IRRI, and supported of funding by the government of Switzerland. From 1991 to 1998, most of the breeding lines were imported from IRRI, Philippines and from Thai-IRRI program. Out of 1.627 lines of F₂ population, 4 lines were released as TDK and PNG varieties. Out of 64 imported promising lines, 13 lines were released as TDK, TSN, PNG and NTN varieties for different agro-climatic zones in Lao PDR. Hybridization at RCCRC was started in 1994, since then, about 272 crosses were made by the Lao breeders. Out of 272 crosses made, so far 8 clones were released as TDK and TSN varieties and 34 lines were identified as promising lines. Among all parents used in the crossing program at RCCRC, TDK 1 was the dominant parent for evolving promising lines for Lao PDR.

This is an initiation of the database development for the breeding program in Laos. It would be needed more time and budget for the further development of the database, which is Microsoft ACCESS should be applied, due to the software could be able to develop a “search engine” for easy extraction of information and it can develop

more workable database for the breeding program. This database will be able to use to analysis in many genetic diversity, which may be useful to develop very focus breeding programs for different objectives. The Lao breeders/agronomists should be able to utilize most of the germplasm evaluation work and to incorporate the germplasm evaluation information (quality, pest and disease resistance, drought resistance, senility and so on), to this database and use all available information to develop good breeding lines for the future breeding program(s). The database will help Lao breeders to do preliminary screening with the available data and then forces on further field evaluation if necessary. Therefore, the development of the hardware to access the database is importance and training on Microsoft access operation should be consider.

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Annexure 1: Database structure for collecting breeding data of F2 lines from the main and sub-research stations in Lao PDR..

F2 Population				
No	Cross Number	Parents	Year introduced	Total F2 lines
7	IR66321	IR43506-UBN-520-1-3-1-1/IR43342-10-1-1-3	1993	7
8	IR66322	IR43506-UBN-520-1-3-1-1/IR49804-UBN-7-B-1-4-1	1993	2
9	IR66461	IR44526-47-3-2-2/IR43506-UBN-520-1-3-1-1//IR46331-PMI-32-2-1-1	1993	7
11	IR66488	IR49733-SRN-16-B-1-2/IR51089-65-1-1-3//IR43506-UBN-520-1-3-1-1	1993	40
12	IR66501	IR15106-24-1-3/IR41431-68-1-2-3//KKNLR77113-UBN-B3-96-2-3	1993	35
13	IR66545	IR97640-45-2-2/GELOMBANG//IR43506-UBN-520-1-3-1-1	1993	26
18	IR68101(TDK7)	IR63943-25-B-1/IR55810-UBN-1-1-2-1-1	1993	5
19	IR68102 (PNG5)	IR63943-25-B-1/IR57530-UBN-9-1-1	1993	60
20	IR68104	IR64323-41-2/IR55047-UBN-2-2-2-1-2	1993	30
21	IR68105	IR46376-CPA-9-1-1-2/IR57519-PMI-5-3-2-1	1993	41
23	IR68109	IR57519-PMI-5-3-2-2/IR59762-15-B-1-2-3	1993	68
24	IR68111	IR57542-218-1-3-3-2/IR60290-CPA-2-1-1-2	1993	39
32	IR70823	IR49746-UBN-33-B-3-1/IR55810-UBN-1-1-2-1-1//SK8-21-3-1	1997	57
33	IR70824 (TDK6)	IR54081-CPA-3-B-1-3/IR41110-B-B-43-1//SLK3-1-2-2	1996	10
34	IR70825	IR54081-CPA-3-B-1-3/IR41110-B-B-43-1//SLK8-21-3-1	1997	64
35	IR70826	IR54081-CPA-3-B-1-3/IR57530-UBN-9-1-2-3-1//SLK8-21-3-2	1996	30
36	IR70827	IR54081-CPA-3-B-1-3/IR57530-UBN-9-1-2-3-1//RD6	1996	20

Annexure 1: Cont.				
F2 Population				
No	Cross Number	Parents	Year introduced	Total F2 lines
37	IR70828	IR54081-CPA-3-B-1-3/SABITA//SLK3-1-2-2	1996	19
38	IR71471	IR60290-CPA-1-2-1-1-3/RD6//SLK3-1-2-3	1996	25
39	IR71472	IR63943-25-B-1/RD6//SLK8-21-3-1	1996	28
40	IR71479	ABHAYA/WS91(Acco0797)//IR60298-PMI-18-1-3-1	1996	15
41	IR71480	ABHAYA/WS91 (Acco0797)//RD6	1996	32
42	IR71489	HOM DO/ABHAYA//RD6	1996	10
43	IR71490	HOM DO/ABHAYA//IR43070-UBN-501-2-2-2-1	1996	34
44	IR71491	HOM DO/ABHAYA//IR43070-UBN-507-1-2-2-1	1996	30
45	IR71492	KDML105/IR66883-10-2-B//KDML86-G24-4-3	1996	54
46	IR71493	KDML105/IR66883-10-2-B//KRAYA	1996	12
47	IR71494	KDML4-105/IR66883-10-2-B//IR57546-PMI-1-B-2-2	1996	36
48	IR71504	WS91(Acco0797)/SK8-21-3-1//IR43070-UBN-507-1-2-2-2-1	1996	68
49	IR71505	WS91(Acco0797)/SK8-21-3-1//IR43070-UBN-501-1-2-2-2-2	1996	48
50	IR71506	WS91(Acco0797)/SK8-21-3-1//RD6	1996	28
51	IR71510 (TDK9)	IR43070-UBN-501-2-1-1-1/RD6//RD6	1996	6
52	IR72009	ABHAYA/RD6//IR43070-UBN-501-1-2-2-1	1997	31
53	IR72039	SK8-21-3-1/RD6//IR43070-UBN-501-1-2-2-1	1997	42
54	IR72040	SOMALY2-023-5-1-1-1/IR55008-8-1-2-2-3//IR57458-PMI-7-B-1-1	1997	17
Total				1.627

Annexure 2: F3 lines introduced from IRRI and Thai-IRRI.

F3 Population				
No	Cross Number	Parents	Year introduced	Total F3 lines
6	IR72008	ABHAYA/RD6//IR43070-UBN-501-2-2-2-1	1997	16
7	IR72022	IR57515-PMI-8-1-1-SRN-1-1/CN846-6-6//IR63429-23-1-3-3	1998	19
8	IR72025	IR57546-PMI-1-B-2-2//ABYAHA//R371-1	1998	5
9	IR72037	R371-1/IR55008-1-2-2-3//IR66516-24-3-B	1998	20
10	IR72655	KARAMANA/RD6//KKNLR75051-PMI-47-68-1	1998	66
11	IR72657	KARAMANA/IR57546-PMI-1-B-2-2//SLK3-1-2-2	1998	18
12	IR72661	KRAHAM/IR60298-PMI-18-1-3-1//IR43069-UBN-514-1-3-2-1	1998	23
13	IR72666	SLK8-21-3-1/RD6//PRE1	1998	23
14	IR72667	WS91 (Acc0797)/ABHAYA//IR43070-UBN-511-2-1-1-1	1998	17
15	IR72668	WS91 (Acc0797)/IR43070-UBN-511-2-2-2-1//RD6	1998	3
16	IR72669	ABHAYA/IR58307-210-1-2-3-3-1//RD15	1998	1
17	IR72672	KDML105/IR66883-44-3-1//RD10	1998	1
18	IR72707	GEU79058-PMI-7-2/IR49788-SKN-8-B-1-4-1//IR49733-SRN-7-B-1-2	1998	1
19	IR72708	GEU79058-PMI-7-2/IR49788-SKN-8-B-1-4-1//RD10	1998	4
20	IR72710	GEU79058-PMI-7-2/IR51592-PMI-18-B-1-1//RD10	1998	11
21	IR72738	SPTLR80146-PRE-7-1-2-2/IR43070-UBN-501-2-2-2-1//KKNLR75051-PMI-65-3-1-1	1998	60
22	IR72739	SPTLR80146-PRE-7-1-2-2/IR43070-UBN-501-2-2-2-1//PRE1	1998	43
23	IR72740	SPTLR80146-PRE-7-1-2-2/IR43070-UBN-501-2-2-2-1//RD6	1998	10
24	IR72741	SPTLR80146-PRE-7-1-2-2/IR43070-UBN-501-2-2-2-1//IR43069-UBN-514-1-3-2-1	1998	46

Annexure 2: Cont.

F3 Population				
No	Cross Number	Parents	Year introduced	Total F3 lines
25	IR72742	SPTLR80146-PRE-7-1-2-2/SLK8-21-3-1//KKNLR75051-PMI-65-3-1-1	1998	22
26	IR72743	SPTLR80146-PRE-7-1-2-2/SLK8-21-3-1//PRE1	1998	21
27	IR72744	SPTLR80146-PRE-7-1-2-2/SLK8-21-3-1//RD6	1998	6
28	IR72745	SPTLR80146-PRE-7-1-2-2/SLK8-21-3-1//IR43070-UBN-511-2-1-1-1	1998	35
29	UBN96	GS91151/KKNLR75051-PMI-47-68-1//NIAW DAM	1998	12
			Total	935

Annexure 3: F4 lines introduced from IRRI and Thai-IRRI.

F4 Population				
No	Cross Number	Parents	Year introduced	Total F4 lines
1	IR70158	IR43485-SKN-512-3-1-1/IR43062-BKN-514-1-3-2-1//M.SUNG SONG	1996	5
2	IR70184	IR43486-14-1-1-2/IR54081-CPA-3-B-1-3//IR49746-UBN-33-B-3-1	1996	9
3	IR70188	IR49733-SRN-5-B-1-2/IR49746-UBN-33-B-3-1//M.SUNG SONG	1996	1
4	IR70189	IR49733-SRN-5-B-1-2/IR54081-CPA-2-B-1-2//M.SUNG SONG	1996	12
5	IR70193	IR49746-UBN-33-B-3-1/IR48103-5-1-2-2-2//IR41109-B-12-29-1	1996	3
6	IR70194	IR49746-UBN-33-B-3-1/IR43070-UBN-501-2-1-1-1//IR43525-73-3-3-1	1996	14
7	IR70195	IR49746-UBN-33-B-3-1/IR43070-UBN-501-2-1-1-1//IR43450-SKN-506-2-2-1-1	1996	6
8	IR70197	IR49746-UBN-33-B-3-1/IR48103-5-1-2-2-2//IR43450-SKN-506-2-2-1-2	1996	32
9	IR70202	IR49746-UBN-33-B-3-1/IR43524-55-1-3-2// ?	1996	10
10	IR70219	IR60298-PMI-18-1-3-1/IR29//RD10	1996	1
11	IR70220	IR60298-PMI-18-1-3-1/IR29//RD10	1996	10
12	IR70232	IR65/IR49733-SRN-5-B-1-2//IR84103-5-1-2-2-2	1996	1
13	IR70234	IR65/IR49733-SRN-5-B-1-2//RD6	1996	2
14	IR UBN1	CT9993-5-10-1-M/IR43070-UBN-507-1-7-2-1//HOM DO ACE0785	1996	6
15	IR UBN2	CT9993-5-10-1-M/IR43070-UBN-501-2-1-1-1//CT9895-5-1-M-4-M-1	1996	2
16	IR UBN3	CT9993-5-10-1-M/IR43070-UBN-501-2-1-1-1//RD6	1996	16
17	IR UBN6	CT9993-5-10-1-M/BKNIR8015R-R-PSL-3-1//UKWS91 ACE0797	1996	2
18	IR UBN7	CT9993-5-10-1-M/BKNLR78015-R-R-PLS-3-1//Dangxengace0647	1996	14
19	IRUBN8	IR43070-UBN-501-2-1-1-1/RD6//SLK-3-1-2-2	1996	43
20	IRUBN9	CT9993-5-10-1-M/IR43070-UBN-501-2-1-1-1//KDML86G2U-4-2	1996	1
21	IR70829	IR49746-UBN-33-B-3-1/IR55810-UBN-1-1-2-1//SK8-21-3-1	1997	3
22	IR71514	IR43070-UBN-501-2-1-1-1/RD6	1997	5
23	IR71805	KKNLR87047-UBN-B5-12-2/RD6	1997	4
			Total	202

Annexure 4: F5 lines introduced from IRRI and Thai-IRRI.

F5 Population				
No	Cross Number	Parents	Year introduced	Total F5 lines
6	IR66321	IR43506-UBN-520-1-3-1-1/IR43342-10-1-1-3// ?	1996	3
7	IR66322	IR43506-UBN-520-1-3-1-1/IR49804-UBN-7-B-1-4-1// ?	1996	3
8	IR66545	IR97640-45-2-2/GELOMBANG//IR43506-UBN-520-1-3-1-1	1996	25
9	IR70168	IR43524-55-1-3-2/IR49733-SRN-5-B-1-2//IR49746-UBN-33-B-3-1	1998	1
10	IR70196	IR49746-UBN-33-4-3-1/IR43450-SKN-506-2-2-1/IR43524-55-1-3-2	1998	10
11	IR70198	IR49746-UBN-33-B-3-1/IR43524-55-1-3-2//IR46329-SRN-31-3-2-1	1998	21
12	IR70200	IR49746-UBN-33-B-3-1/IR43524-55-1-3-2//IR54081-CPA-3-1-B-1-3	1998	33
13	IR70215	IR57519-PMI-5-B-2-2/IR57514-299-2-1-1//IR43524-55-1-3-2	1998	2
14	IR70716	IR43524-55-1-3-2/IR52555-UBN-3-2-1//KDML105	1998	1
15	IR70844	ABHAYA/IR57515-PMI-8-1-1-SRN-1-1//IR43524-55-1-3-2	1998	6
16	IR71042	IR43487-17-1-41-1/IR46329-SRN-31-3-2-1	1998	9
17	IR71043	IR48002-8-3-2-2/IR46329-SRN-34-3-1-2	1998	2
18	IR71049	IR49733-SRN-7-B-1-5-1/IR43487-17-1-41-1	1998	9
19	IR71469	IR43450-SRN-516-2-3-2-2/RD6//SK8-21-3-2	1998	10
20	IR71511	CT9993-5-10-1-M/IR43070-UBN-501-2-1-1-1//SK8-21-3-1	1998	12
21	IR71512	CT9993-5-10-1-M/BKNLR78015-R-R-PSL-3-1//WS91 (Acco0797)	1998	4
22	IR71513	CT9993-5-10-1-M/BKNLR78015-R-R-PSL-3-1//DANG XENG (Acco 647)	1998	7
23	IR71517	UBNLR87001-SRN-10-1-3-1/KKNLR82003-SKN-69-1-1	1998	3
24	IR71797	IR43506-UBN-530-2-1-1/KKNLR75051-PMI-47-68-1	1998	5
25	IR71807	KKNLR87047-UBN-B5-12-2/IR43070-UBN-511-2-1-1-1	1998	8
26	IR71817	UBNLR87001-SRN-10-1-3-1/KKNLR82003-SKN-69-1-1	1998	10
27	IR71818	UBNLR87001-SRN-10-1-3-1/RD6	1998	4
28	IR72961	CT9993-5-10-1-M/IR54071-UBN-1-1-3-1-2	1998	3
29	IR72963	KKNLR87047-UBN-B5-12-2/88168 (NIAW DAM)	1998	7
30	IR74956	88168 (NIAW DAM)/KKNLR75051-PMI-47-68-1	1998	10
			Total	239

Annexure 5: F6 lines introduced from IRRI and Thai-IRRI.

F6 Population				
No	Cross Number	Parents	Year introduced	Total F6 lines
1	IR70156	IR43449-SKN-522-3-1-3/CT9993-5-10-1-M//IR60298-PMI-18-1-3-1	1996	2
2	IR70157	IR43449-SKN-522-3-1-3/CT9993-5-10-1-M//KDML105	1996	3
3	IR70168	IR43524-55-1-3-2/IR49733-SRN-5-B-1-2//IR49746-UBN-33-B-3-1	1996	23
4	IR70181	IR43524-55-1-3-2/IR57519-PMI-5-B-2-2//IR43487-11-2-3-2	1996	1
5	IR70199	IR49766-UBN-33-B-3-1/IR43524-55-1-3-2//IR52560-SKN-4-B-1-3	1996	3
6	IR70201	IR49746-UBN-33-B-3-1/IR43524-55-1-3-2// KDML105	1996	3
7	IR70204	IR49746-UBN-33-B-3-1/IR55810-UBN-1-1-2-1-1//IR43524-55-1-3-2	1996	2
8	IR70206	IR51052-5-2-1-1/CT10069-27-1-6-M-3//IR46329-SRN-31-3-2-1	1996	3
9	IR70207	IR54199-SRN-4-B-1-1/IR43523-SRN-504-2-2-3-2//KDML105	1996	1
10	IR70210	IR54199-SRN-4-B-1-1/KDML106//IR46329-SRN-31-3-2-1	1996	2
11	IR70221	IR60298-PMI-18-1-3-1/IR43522-74-1-2-2-1//IR49746-UBN-33-B-3-1	1996	12
12	IR70224	IR60298-PMI-18-1-3-1/IR65//IR49746-UBN-33-B-3-1	1996	12
13	IR70232	IR65/IR49733-SRN-5-B-1-2//IR84103-5-1-2-2-2	1996	2
14	IR70233	IR65/IR49733-SRN-5-B-1-2//KDML105	1996	4
15	IR70235	IR60290-CPA-1-2-1-1-3/IR57519-PMI-5-B-2-2//IR57458-PMI-7-B-1-1	1996	14
16	IR70849	CT6241-17-5-1/KDML86G4-4-19//IR46329-SRN-31-3-2-1	1996	2
17	IR71490	HOM DO/ABHAYA//IR43070-UBN-501-2-2-2-1	1996	7
18	IR71507	CT9993-5-10-1-M/IR43070-UBN-507-1-7-2-1//HOM DO (ACE0785)	1996	10
19	IR71508	CT9993-5-10-1-M/IR43070-UBN-501-2-1-1//CT9895-5-1-M-4-M-1	1996	9
20	IR71544	IR73070-UBN-501-2-1-1-1/RD6//SLK3-1-2-2	1996	2
21	IR71805	KKNLR82005-CPA-31-1-1-5-1/RD6	1996	7
Total				124

Annexure 6: F7 lines introduced from IRRI and Thai-IRRI.

F7 Population				
No	Cross Number	Parents	Year introduced	Total F7 lines
1	IR68091	IR60290-CPA-1-2-1-1-3/IR57519-PMI-5-B-2-2//IR57458-PMI-7-B-1-1	1997	8
2	IR68198	IR43470-7-3-5-1/IR46292-24-2-2-1-2//IR57512-96-1-2-3-3	1997	11
3	IR68791	CT9900-CA-30/IR56592-21-1-3-1-2//KDML105	1997	1
4	IR68821	CT9899-32-1/IR55829-B-B-3-1-2//IR43450-SKN-516-2-3-2-2	1997	12
5	IR68822	CT9899-32-1/IR55829-B-B-3-1-2//IR43450-SKN-516-2-3-2-3	1997	5
6	IR68853	IR54977-UBN-6-1-3-3-3/IR41431-68-1-2-3//IR57514-PMI-5-B-1-2	1997	1
7	IR69513	IR57514-SRN-299-3-2-4/IR57515-PMI-8-1-1-SRN-1-1//IR54324-55-1-3-2	1997	11
8	IR68796	CT9992-22-2-4-M/IR56592-21-1-3-1//KDML105	1998	1
9	IR68835	IR60290-CPA-1-2-1-1-3/IR57519-PMI-5-B-2-2//IR57458-PMI-7-B-1-1	1998	13
10	IR69502	IR57514-PMI-5-B-1-2/IR57515-PMI-PMI-8-1-1-SRN-1-1//IR43524-55-1-3-2	1998	4
11	IR69507	IR57514-PMI-5-B-1-2/KDML105//IR49746-UBN-33-B-3-1	1998	2
12	IR69515	IR57514-SRN-299-3-2-4/IR57515-PMI-8-1-1-SRN-1-1//IR57519-PMI-5-B-2-5	1998	2
13	IR70199	IR49746-UBN-33-B-3-1/IR43524-55-1-3-2//IR52560-SKN-4-B-1-3	1998	3
14	IR70219	IR60829-PMI-18-1-3-1/IR29//RD6	1998	2
15	IR70824	IR54081-CPA-3-B-1-3/IR41110-B-B-43-1//SLK3-1-2-2	1998	8
16	IR71471	IR60290-CPA-1-2-1-1-3/RD6//SLK3-1-2-2	1998	1
17	IR74627	IR69502-15-SRN-4-UBN-3-B-7/ *2KDML105	1998	23
18	IR59513	IR57515-SRN-299-3-2-4/IR57514-PMI-8-1-1-SRN-1-1//IR54324-55-1-3-2	1998	7
19	IR59514	IR57515-SRN-299-3-2-4/IR57514-PMI-8-1-1-SRN-1-1//IR54119-4-B-1-1	1998	2
20	IR68109	IR57519-PMI-5-B-2-2/IR59762-15-B-1-2-3	1998	4
21	IR68796	CT9992-22-2-4-M/IR56592-21-1-3-1//KDML105	1998	3
22	IR68835	IR60290-CPA-1-2-1-1-3/IR57519-PMI-5-B-2-2//IR57458-PMI-7-B-1-1	1998	7
23	IR69505	IR57514-PMI-5-B-1-2/KDML105//IR49746-UBN-33-B-3-1	1998	10
24	IR70221	IR60298-PMI-18-1-3-1/IR43522-74-1-2-2-1//IR49746-UBN-33-B-3-1	1998	4
25	IR70224	IR60298-PMI-18-1-3-1/IR65//IR49746-UBN-33-B-3-1	1998	13
26	IR70825	IR54081-CPA-3-1-3-B-3/IR41110-B-B-43-1//SK8-21-3-1	1998	2
27	IR70826	IR54081-CPA-3-1-3-B-3/IR57530-UBN-9-1-2-3-1//SK8-21-3-1	1998	2
			Total	162

Annexure 7: Promising lines introduce in 1991.

Entries No	Designation	Year introduced
1	DOK MAY ACC 688	1991
2	GEU79069-SKN-5-1-1	1991
3	IR41278-9-2-3-2-1	1991
4	IR43064-UBN-514-1-3-2-1	1991
5	IR43069-UBN-507-36-3-3-1	1991
6	IR43069-UBN-507-3-1-2-2 (TDK1)	1991
7	IR43086-UBN-505-2-3-1 (PNG1)	1991
8	IR43506-UBN-520-2-1-1	1991
9	IR46346-KKN-1-2-1-3	1991
10	IR46463-CPA-5-2-1-1 (TSN1)	1991
11	IR49746-UBN-33-B-3-1	1991
12	IR52555-UBN-2-B-2-1	1991
13	IR52561-UBN-3-B-1-1	1991
14	IR54073-UBN-3-B-1-1	1991
15	IR54082-CPA-1-B-2-1	1991
16	IR57514-SRN-273-1-1-1	1991
17	IR60283-CPA-51-KKN-1-1	1991
18	KKNLR75051-PMI-65-3-1-1 (TDK2)	1991
19	KKNLR77113-UBN-B3-195-2-1	1991
20	KKNLR82022-PRE-12-3-1-GM-7	1991
21	SPT7201-PRE-26-2-GM-7	1991
22	SPT7201-PRE-26-2-GM-7	1991
23	SPT7202-PRE-8-1	1991
24	SPTLR80146-7-1-2-2	1991
25	SPTLR82090-PAN-1-1	1991

Annexure 8: Promising line introduced in 1993.

Entries No	Designation	Year introduced
1	BKNLR78015-R-R-10-1	1993
2	BKNLR78015-R-R-PSL-3-1 (TDK10)	1993
3	GEU79069-SKN-5-1-1	1993
4	IR39177-SPT-13-1-2-1-1	1993
5	IR39177-SPT-13-1-2-5-3	1993
6	IR41279-9-2-3-2-1	1993
7	IR43040-PMI-B-4-1-2-1	1993
8	IR43069-UBN-515-1-1-2-1	1993
9	IR43450-SKN-516-2-3-2-2	1993
10	IR43670-UBN-501-2-1-1-1 (TDK4)	1993
11	IR46356-KKN-1-2-1-3	1993
12	IR48857-KKN-11-B-1-3	1993
13	IR49766-KKN-52-B-2-3 (NTN1)	1993
14	IR51128-SKN-42-B-1-3	1993
15	IR54073-UBN-2-1-2	1993
16	IR54073-UBN-5-B-1-2	1993
17	IR57530-UBN-9-1-1	1993
18	IR57530-UBN-9-1-2-3-1	1993
19	IR60258-CPA-51-KKN-1-2-1-3	1993
20	IR62089-PMI-26-1-SRN-2-1	1993
21	SPT7201-PRE-26-2-GM-3	1993
22	SPT7201-PRE-26-2-GM-4	1993

Annexure 9: Promising line introduced in 1994.

Entries No	Designation	Year introduced
1	IR68835-44-8--B-B-2-4-B (PNG4)	1994
2	IR68835-130-B-B-2	1994
3	IR69507-18-SRN-1-UBN-1-UBN-1-4-4	1994
4	IR69507-18-SRN-1-UBN-1-UBN-1-4-5	1994
5	IR69507-18-SRN-1-UBN-1-UBN-1-5-1	1994
6	IR69507-18-SRN-1-UBN-1-UBN-1-5-2	1994
7	IR69507-18-SRN-1-UBN-1-UBN-1-5-3	1994
8	IR69507-18-SRN-1-UBN-1-UBN-1-5-5	1994
9	IR69507-18-SRN-1-UBN-1-UBN-1-5-6	1994
10	IR69507-18-SRN-1-UBN-1-UBN-1-5-7	1994
11	IR69507-6-SRN-1-UBN-1-UBN-2-1-2	1994
12	IR70168-61-PMI-2-1-4-B	1994
13	IR70168-62-PMI-1-1-B-B	1994
14	IR70198-10-CPA-2-1-B	1994
15	IR70199-1-1-1-1-1 (PNG6)	1994
16	IR70199-41-3-B-3-B	1994
17	IR70199-55-6-B-1-B	1994
18	IR70199-55-6-B-2-B	1994
19	IR70199-58-3-B-1-B	1994
20	IR70200-20-CPA-6-3-1	1994

Annexure 10: Crosses made at RCCRC.

DESIGNATION No	CROSSES	YEAR
TDK10020	IR57514/TDK1	1996
TDK10021	IR57514/TDK1//TDK1	1997
TDK10022	MEANG NGA/IR253-100	1997
TDK10023	MEANG NGA/TDK1	1997
TDK10024	MAK HING/IR57514	1997
TDK10025	MAK HING/TDK1	1997
TDK10026 (TSN2)	I KHAO/IR57514	1997
TDK10027 (TSN 3)	I KHAO/TDK1	1997
TDK10028	MAK NGOM/TDK1	1997
TDK10029	HOMPHOOPHAN(SKN)/TDK1	1997
TDK10030	HOMPHOOPHAN(SKN)/RD10	1997
TDK10031	RD10/HOMPHOOPHAN(SKN)	1997
TDK10032	IR43070-UBN-501-2-1-1/TDK1	1997
TDK10033 (TSN4)	IR43070-UBN-501-2-1-1/IR57514	1997
TDK10034	RD6/TDK1	1997
TDK10035	RD23/TDK5	1997
TDK10036	TDK1/IR65	1997
TDK10037	RD10/TDK1	1997
TDK10038 (TDK8)	CR203/RD10	1997
TDK10039	TDK1/TDK3	1997-98
TDK10040	TDK3/TDK1	1997-98
TDK10041	TDK1/IR29	1997-98
TDK10042	TDK1/IR65//TDK3	1997-98
TDK10043	CR203/RD10//TDK3	1997-98
TDK10044	CR203/RD10//TDK1	1997-98
TDK10045	RD10/IR65	1997-98
TDK10046	RD10/IR29	1997-98
TDK10047 (TDK11)	RD23/TDK5//TDK1	1997-98
TDK10048	IR253-100/IR49766-KKN-52-B-2-3	1997-98

Annexure 10: Conti.

DESIGNATION No	CROSSES	YEAR
TDK10049	RD10/PSBRC10	1997-98
TDK10050	RD10/PSBRC1	1997-98
TDK10051	MEANG GNA/IR253-100//TDK1	1997-98
TDK10052	IR43506-UBN-520-2-1-1//TDK1	1998
TDK10053	IR43506-UBN-520-2-1-1//IR46463	1998
TDK10054	IR43506-UBN-520-2-1-1//IR43070-UBN-507-1-2-2-1	1998
TDK10055	PNG1//TDK1	1998
TDK10056	IR253-100//IR43070-UBN-501-2-1-1-1	1998
TDK10057	TDK1//TDK2	1998
TDK10058	HOMPHOOPHAN/VARIETY3 (IR57530-UBN-9-1-2-1-1)	1998
TDK10059	VARIETY3 (IR57530-UBN-9-1-2-1-1)//RD6	1998
TDK10060	IR46463//RD6	1998
TDK10061	IR253-100//RD6	1998
TDK10062	TDK3//HOMPHOOPHAN (SKN)	1998
TDK10063	TDK3//RD6	1998
TDK10064	IR253-100//IR49766-KKN-52-B-2-3//TDK1	1998
TDK10065	RD10//IR29//TDK1	1998
TDK10066	RD10//PSBRC10//TDK1	1998
TDK10067	RD10//PSBRC10//TDK3	1998
TDK10068	RD10//PSBRC1//IR43070-UBN-507-1-2-2-1	1998
TDK10069	RD10//PSBRC1//TDK2	1998
TDK10070	RD10//IR68//TDK1	1998
TDK10071	RD10//IR68//IR253-100	1998
TDK10072	TDK1//IR29//TDK5	1998
TDK10073	TDK3//TDK1	1998
TDK10074	RD23//TDK3	1998
TDK10075	RD23//TDK1	1998
TDK10076	RD23//TDK2	1998
TDK10077	TDK2//CR203	1998
TDK10078	TDK5//TDK1	1998

Annexure 10: Conti.

DESIGNATION No	CROSSES	YEAR
TDK10079	IR43070-UBN-507-1-2-2-1/CR203	1998
TDK10080	VARIETY3 (IR57530-UBN-9-1-2-1-1)/RD6/TDK3	1998-99
TDK10081	IR43506-UBN-520-2-1-1/TDK1//HOMPHOOPHAN (SKN)	1998-99
TDK10082	TDK3/HOMPHOOPHAN (SKN)//IR43070-UBN-507-1-2-2-1	1998-99
TDK10083	RD23/TDK3//HOMPHOOPHAN	1998-99
TDK10084	PNG1/TDK1//VARIETY3 (IR57530-UBN-9-1-2-1-1)	1998-99
TDK10085	HOMPHOOPHAN/VARIETY3 (IR57530-UBN-9-1-2-1-1)// HOMPHOOPHAN	1998-99
TDK10086	IR253-100/HOMPHOOPHAN	1998-99
TDK10087	IR253-100/TDK3	1998-99
TDK10088	IR253-100/IR43070-UBN-507-1-2-2-1	1998-99
TDK10089	PSBRC10/RD10	1998-99
TDK10090	RD23/TDK1	1998-99
TDK10091	IR253-100/RD6//TDK1	1998-99
TDK10092	PSBRC10/TDK5	1998-99
TDK10093 (TSN6)	TDK3/IR43070-UBN-507-1-2-2-1	1998-99
TDK10094	IR36/TDK3	1998-99
TDK10095	IR36/IR43070-UBN-507-1-2-2-1	1998-99
TDK10096	TDK3/TDK1//IR68	1998-99
TDK10097	IR43070-UBN-507-1-2-2-1/CR203//RD10	1998-99
TDK10098	IR68/TDK1	1998-99
TDK10099 (TSN5)	IR68/RD10	1998-99
TDK10100	IR36/HOMPHOOPHAN (SKN)	1998-99
TDK10101	TDK5/TDK1//RD6	1998-99
TDK10102	RD23/TDK3//RD10	1998-99
TDK10103	RD23/TDK3//TDK1	1998-99
TDK10104	RD23/TDK2//TDK1	1998-99
TDK10105	RD23/TDK2//IR43070-UBN-507-1-2-2-1	1998-99
TDK10106	PNG1/ TDK1//TDK1	1998-99
TDK10107	TDK2/CR203//IR43070-UBN-507-1-2-2-1	1998-99

Annexure 10: Conti.

TDK10108	TDK2/CR203//RD10	1998-99
DESIGNATION No	CROSSES	YEAR
TDK10109	TDK2/CR203//TDK5	1998-99
TDK10110	IR36/RD10	1998-99
TDK10111	IR68/IR46463-CPA-5-2-1-1	1998-99
TDK10112	PSBRC10/RD10//RD16 (LOCAL)	1999
TDK10113	IR8/HOMPHOOPHAN	1999
TDK10114	IR253-100/IR43070-UBN-507-1-2-2-1//RD6	1999
TDK10115	RD16 (LOCAL)/DO YUAN	1999
TDK10116	RD16(LOCAL)/IR49571-23-2-2-3-3	1999
TDK10117	RD16(LOCAL)/MEANG GNA	1999
TDK10118	HOMPHOOPHAN/TAKHIAT	1999
TDK10119	TDK1/YUAN DO	1999
TDK10120	TDK1/DO YUAN	1999
TDK10121	IR43070-UBN-501-2-1-1/IR8	1999
TDK10122	IR8/RD6	1999
TDK10123	RD16 (LOCAL)/TDK1	1999
TDK10124	RD23/TDK1//TDK5	1999
TDK10125	IR68/IR46463-CPA-5-2-1-1//TDK3	1999
TDK10126	IR68/IR46463-CPA-5-2-1-1//RD10	1999
TDK10127	TDK1/IR28128-45-2	1999
TDK10128	IR36/IR43070-UBN-507-1-2-2-1//TDK3	1999
TDK10129	IR8/TDK1	1999
TDK10130	IR36/TDK3//TDK1	1999
TDK10131	IR36/HOMPHOOPHAN//TDK1	1999
TDK10132	BLACK 7712/IR253-100	2000
TDK10133	BLACK 7697/TDK5	2000
TDK10134	BLACK7697/TDK1	2000
TDK10135	BLACK7712/TDK5	2000
TDK10136	BLACK7697/IR253-100	2000
TDK10137	BLACK7712/TDK1	2000

Annexure 10: Conti.

TDK10138	HOMSUPHANE BURY/TDK5	2000-01
DESIGNATION No	CROSSES	YEAR
TDK10139	RD15/TDK3	2000-01
TDK10140	RD15/IR253-100	2000-01
TDK10141	SUPHANBURY 90/TDK1	2000-01
TDK10142	SUPHANBURY 90/TSN1	2000-01
TDK10143	HOMSUPHANE BURY/IR68	2000-01
TDK10144	TDK4/IR253-100	2000-01
TDK10145	HOMTHONG/TDK3	2000-01
TDK10146	HOMSUPHANBURY/CR203	2000-01
TDK10147	SUPHANE BURY 60/TDK1	2000-01
TDK10148	SUPHANE BURY 90/TDK3	2000-01
TDK10149	HOMSUPHANBURY/TDK3	2000-01
TDK10150	TDK3/IR42596-B-8-B-3-B	2002-03
TDK10151	IR253-100/HOMTHONG	2002-03
TDK10152	IR57514-PMI-5-B-2-1/CR203	2002-03
TDK10153	TDK3/HOMTHONG	2002-03
TDK10154	TDK3/SUPHANBURY 60	2002-03
TDK10155	RD15/IR253-100	2002-03
TDK10156	RD7/RD15	2002-03
TDK10157	TDK4/IR253-100	2002-03
TDK10158	RD21/RD15	2002-03
TDK10159	TDK3/RD21	2002-03
TDK10160	TDK3/TDK5	2002-03
TDK10161	RD15/TDK3	2002-03
TDK10162	RD10/TDK4	2002-03
TDK10163	IR57514-PMI-5-B-2-1/NTN1	2002-03
TDK10164	RD10/SUPHANBURY 60	2002-03
TDK10165	TDK3/TDK4	2002-03
TDK10166	HOMSUPHANE BURY/CR203	2002-03
TDK10167	RD15/TDK1	2002-03

Annexure 10: Conti.

TDK10168	TDK3/TSN1	2002-03
DESIGNATION No	CROSSES	YEAR
TDK10169	IR57514-PMI-5-B-2-1/CR203	2002-03
TDK10170	RD10/TDK7	2003
TDK10171	IR57514-PMI-5-B-2-1/CR203//RD15	2003
TDK10172	RD15/TDK1//TDK7	2003
TDK10173	IR253-100/TDK7	2003
TDK10174	TDK3/TDK6	2003
TDK10175	IR57514-PMI-5-B-2-1/NTN1//TDK1	2003
TDK10176	IR253-100/TDK1	2003
TDK10177	IR253-100/HOMTHONG	2003
TDK10178	RD15/IR253-100//TDK1	2003
TDK10179	RD15/ TDK3//NTN1	2003
TDK10180	TDK1/ TDK7	2003
TDK10181	TDK1/ TDK5	2003
TDK10182	TDK1/ HOM LAI	2004
TDK10183	TDK1/ IR55419-04	2004
TDK10184	TDK1/ IR74371-3-1-1	2004
TDK10185	TDK1/ MEUANG NGA	2004
TDK10186	TDK1/ CHAO DENG (Sort)	2004
TDK10187	TDK1/ CHAO AMERICA	2004
TDK10189	TDK1/ I KAO	2004
TDK10190	TDK1/ IR68	2004
TDK10191	TDK1/ RD6	2004
TDK10192	TDK1/ TDK7	2004
TDK10193	TDK1/ NANG NOUANE	2004
TDK10194	TDK1/ TDK4	2004
TDK10195	TDK1/ TSN1	2004
TDK10196	TDK47-B-8-6-1-2-3-B/ CHAO AMERICA	2004
TDK10198	TDK47-B-8-6-1-2-3-B/ CHAO AMERICA	2004
TDK10200	TDK47-B-6-1-2-3-B/ CHAO DENG	2004

Annexure 10: Conti.

TDK10201	TDK47-B-6-1-2-3-B/ ANG DO	2004
DESIGNATION No	CROSSES	YEAR
TDK10202	TDK47-B-6-1-2-3-B/ IR74371-3-1-1	2004
TDK10203	TDK47-B-6-1-2-3-B/ KHAM 14	2004
TDK10204	TDK47-B-6-1-2-3-B/ MEUANG NGA	2004
TDK10205	TDK47-B-6-1-2-3-B/ CHAO	2004
TDK10206	TDK47-B-6-1-2-3-B/ TDK5	2004
TDK10207	TDK47-B-6-1-2-3-B/ HOM THONG	2004
TDK10210	IR253-100/ CHAO DENG (Sort)	2004
TDK10211	IR253-100/ IR55419-04	2004
TDK10212	IR253-100/ MEUANG NGA	2004 2004
TDK10213	IR253-100/ HOM 1	2004
TDK10218	(F1) TDK1/TKD7// IR74371-3-1-1	2004
TDK10219	(F1) TDK1/TKD7// IR755419-04	2004
TDK10220	(F1) TDK1/TKD7// HOM KEO	2004
TDK10221	(F1) TDK1/TKD7// MEUANG NGA	2004
TDK10222	(F1) TDK1/TKD5// ANG DO	2004
TDK10223	(F1) TDK1/TKD5// I KAO	2004
TDK10224	(F1) TDK1/TKD5// HOM 1	2004
TDK10226	TDK3/ VARIETY 3	2004
TDK10227	TDK6/ TDK5	2004
TDK10228	TDK6/ SUPANBURY 60	2004
TDK10230	TDK5/ MEUANG NGA	2004
TDK10231	TDK7/ IR68	2004
TDK10232	TDK7/ CHAO DENG (Sort)	2004
TDK10233	ANG DO/ MEUANG NGA	2004
TDK10234	TDK1/ CHAODENG 1	2004-05
TDK10235	TDK1/ TDK7	2004-05
TDK10236	TDK5/ TDK21-B-24-19-1-B	2004-05
TDK10238	TDK7/ Hom1	2004-05
TDK10239	TDK7/ CHAO DENG2	2004-05

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TDK10244	TDK5/ RD6	2004-05
DESIGNATION No	CROSSES	YEAR
TDK10245	TDK5/ CHAO DENG 2	2004-05
TDK10246	TDK1/ HANG Yi	2004-05
TDK10247	TDK5/ CHAO DENG	2004-05
TDK10248	TDK5/ CHAO AMERICA	2004-05
TDK10249	TDK1/ IR57514-PMI-5-B-1-2	2004-05
TDK10250	TDK1/ B6144F-MR-6-0-0	2005
TDK10251	TDK1/ IR57514-TDK-9-1-2	2005
TDK10252	TDK1/ PNG3	2005
TDK10253	TDK1/ HOMSAGNEAM (ຫອມສະຫງຸ່ມ)	2005
TDK10254	TDK1/ IR55413-01	2005
TDK10255	TDK1/ IR71525-19-1-1	2005
TDK10256	TDK1/ HOMKENCHAN (ຫອມແກນຈັນ)	2005
TDK10257	TDK4/ RD6	2005
TDK10258	TDK7/ TSN1	2005
TDK10259	TDK6/ IR62443-2B-7-2-1-2	2005
TDK10260	TDK7/ B6144F-MR-6-0-0	2005
TDK10261	TDK7/ HOMSAGHEAM (ຫອມສະຫງຸ່ມ)	2005
TDK10262	KAO PHONG (ເຂົ້າປົ່ງ) / MEUNANG NGA	2005
TDK10263	TDK4/ KDML105	2005
TDK10264	TDK3/ PNG3	2005-06
TDK10265	TDK3/PNG1	2005-06
TDK10266	TDK6/ IR62445-2B-12-12	2005-06
TDK10267	TDK7/ PNG1	2005-06
TDK10268	TDK7/ IR57514-TDK-9-1-2	2005-06
TDK10269	TDK21-B-6-2-1-B/ B6144F-MR-6-0-0	2005-06
TDK10270	TDK21-B-6-2-1-B/ IR55423-01	2005-06
TDK10271	TDK37-B-21-1-2-1/ HANG YI	2005-06
TDK10272	TDK37-B-2-1-2-B/HOMPHOOPHAN (ຫອມພູພານ)	2005-06
TDK10273	TDK37-B-3-2-1/ HOMPHOOPHAN (ຫອມພູພານ)	2005-06

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TDK10274	TDK10037-B-3-2-1/ HOMPHOOPHAN (ຫອມພູພານ)	2005-06
DESIGNATION No	CROSSES	YEAR
TDK10275	TDK10037-B-3-2-1/ HANG YI	2005-06
TDK10276	TDK27-67-1-1-B / HANG YI	2006
TDK10277	TDK27-29-2-2-B / HANG YI	2006
TDK10278	TDK7/HANG YI	2006
TDK10279	TDK27-29-2-2-B/MEUANG	2006
TDK10280	TDK6/IR55423-01	2006
TDK10281	TDK6/B6144F-MR-6-0-0	2006
TDK10282	TDK1/IR55423-01	2006
TDK10283	PHEA KAO/B6144F-MR-6-0-0	2006
TDK10284	PHEA KAO/IR71525-19-1-2	2006
TDK10285	PHEA DEANG/IR55423-01	2006
TDK10286	TDK4/IR62443-2B-7-2-1-2	2006
TDK10287	TDK1/IR62445-2B-12-12	2006
TDK10288	NTN1/KAINOY LUANG	2006
TDK10289	TDK1/KAINOY LUANG	2006
TDK10290	KIANOY LUANG/TDK5	2006
TDK10291	TSN1/HOM NANG NOUANE	2006
TDK10292	TSN1/KAI NOY LUANG	2006
TDK10293	KAI NOY LUANG/ HOMNANG NOUANE	2006
TDK10294	TDK1/PNG6	2006
TDK10295	TDK3/TDK6	2006
TDK10296	TDK3/TDK4	2006
TDK10297	TDK7/MEUANG NGA	2006
TDK10298	TDK4/HOM NANG NOUANE	2006
TDK10299	TSN1/HNN//TSN1	2006-07
TDK10300	TSN1/HNN//KNL	2006-07
TDK10301	TSN1/KNL//TSN1	2006-07
TDK10302	TSN1/KNL//KNL	2006-07