

# Nilgiri Wheat News

(September – December, 2010)

IARI, Regional Station, Wellington

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## Therapeutic wheat variety HW 1095 released

A semi – dwarf, disease resistant, nutritionally rich, economically viable and high yielding *dicoccum* (Samba wheat) wheat developed at Indian Agricultural Research Institute, Regional Station, Wellington using mutation technique is released for parts of Tamil Nadu and Southern hill zone, including non traditional areas in collaboration with Tamil Nadu Agricultural University, Coimbatore as state release. This variety is the outcome of a meticulously planned *dicoccum* improvement programme which was undertaken at IARI, Regional Station, Wellington during 2002 for developing semi dwarf *dicoccum* varieties without altering the quality of the earlier *dicoccum* varieties NP200, NP 201 and NP 202, employing mutation breeding. The gamma irradiation of 10(100 Gy), 20(200Gy), 30 (300Gy), 40(400Gy) Kr  $\gamma$ -rays was given at optimal seed moisture level (Gray: The Gray (Gy) is the unit of absorbed dose and is 1Joul per kg). The irradiated seed were sown as M1 and desirable plants were picked at M2 in 200Gy dose. The stable population was fixed at M4 and during 2005 it was entered in All India co-ordinated Wheat trials as HW 1095. The variety has also been named alternatively as TNAU Wheat COW 2. *Dicoccum* whole wheat flour in the regular diet of diabetic patients

significantly reduces total lipids ( $p \leq .01$ ), triglycerides ( $p \leq .01$ ) and LDL Cholesterol ( $p \leq .05$ ) (Yenagi N *et al.* 2001)\*. HW 1095, the *dicoccum* wheat may thus possess therapeutic properties that can effectively reduce the cardiovascular risk factors. Managing diabetes, a life long ailment, with medicines is very expensive and *dicoccum* diet plays a crucial role in reducing the levels of plasma cholesterol and lowering glycemic responses. Hulled wheat grain of *dicoccum* is used mainly as alternative of expensive medicines in the health food market. Most of the suggested beneficial effects of these cereal are due to specific characteristics of their fibre. The pyrolysis fragments derived from the polysaccharide fraction were significantly more abundant in emmers (*dicoccum*) than in the other genotypes, whereas the highest percentage of lignin-derived pyrolysis fragments was detected in *durum* wheat. Many results suggests that the emmer (*dicoccum*) genetic material may represent a source of high-value dietary fiber and it has much higher fiber contents than common wheat.

\*Yenagi NB, Hanchinal RR, Patil CS, Koppikar V. Glycemic and lipidemic response to *dicoccum* wheat (*Triticum dicoccum*) in the diet of diabetic patients. *Int J Diab Dev Ctries* 2001;21:153-5.

### Salient features of HW 1095

- ❖ It is a NP200 - Mutant through Gamma irradiation (200 Gray) and it matures in 110 days which belongs to early duration group.
- ❖ The culture HW 1095 recorded a mean grain yield of 4040 kg/ha, which is an increase of 26 % grain yield over the NP 200 in a total of 98 trials for the past five years. The culture NP 200 was used as check. The yield of NP 200 was 3190 kg/ha.
- ❖ The culture HW 1095 has 10-12 productive tillers with long and slightly tapering ears. The special attribute of this culture is the broader and waxy green foliage, drooping leaves, non-lodging habit and non shattering of grains. In respect of quality, it is rich in protein (13.2%) and possesses high sedimentation value (25). The reddish colour grain provides good grain appearance score of 8.
- ❖ The culture exhibited resistance to black (stem), yellow (stripe) and brown (leaf) rusts. There is no major incidence of pests in this samba wheat culture.
- ❖ HW 1095 occurred 11/ 18 times in first non-significant group indicating wider adaptability and stability in performance across the zones.

### Wheat rust monitoring – emphasis on Ug 99 race of stem rust

Wheat rust pathotyping was accomplished in 85 field samples of brown rust and 52 of black rust collected from Wellington area in Nilgiri hills. In brown rust, races of 77 group were identified with field dominance of race 77 - 5 followed by 77 - 8, 77A and 77-7. In black rust, two races 40A and 40-1 were found prevailing in equal proportions.

Ug 99 nursery comprising wheat lines named as Morocco (no *Sr* gene), LMPG (no *Sr* gene), Seri - MACS 2496, Bacanora - WH 542, Attila - PBW 343, *Sr*31/LMPG, *Sr*24 (Tr380-14), *Sr*36(Cook-2), *Sr*36(Cook), *Sr*36(LMPG) has been planted at Shimla, Delhi, Indore and Wellington in rabi, 2010 for the purpose of monitoring expected incidence of race Ug 99 in India. This nursery is grown at Wellington throughout the year by doing sowings in such a manner that green foliages are always available to trap the Ug 99 or its variants in case , they reach Nilgiri hills. Critical observations made in the nursery for last one year indicated that race ***Ug 99 or its variants are not present in Nilgiri hills.***

## **New pathotypes of Wheat brown rust (*Puccinia triticina*) noticed at wellington**

Two new pathotypes of wheat brown rust pathogen have been detected in few of the field samples collected from Wellington area of Nilgiri hills. The virulence spectrum of both these pathotypes resemble race 77 – 5 9121R63 – 1). The most peculiar feature of these new variants is their combined virulence for important genes *Lr 9*, *Lr 19* and *Lr 28*. However one of them is not virulent on *Lr 9* present in Kharachia mutant ( 2<sup>nd</sup> line 0 – set). Single spore isolates of these variants are under rigorous testing for repeatability of results. Simultaneously, they are also being evaluated on different stocks of *Lr 9*, *Lr 19* and *Lr 28* obtained from different laboratories across the globe and being maintained at IARI, Regional Station, Wellington.

## **Popularising wheat cultivation in non – traditional areas : proposal for a training programme**

Our efforts to introduce wheats in non-traditional areas of the country, particularly in Southern India covering states of Tamil Nadu, Karnataka and Andhra Pradesh have received overwhelming response. Many resource poor farmers successfully cultivated wheats primarily for the facts that wheat is a short duration crop and it needs lesser irrigation. Thus, rabi season wheat has covered an area of more than 10,000 acres and this we expect to increase substantially in the next rabi season. We have also conducted FLDs for the past eight years including the current season

to popularize wheat cultivation in this part of the country. Performance of the crop was excellent. This achievement has been made possible because of the support of the Agricultural / Extension officers from the state Departments of Agriculture, KVKs and NGOs who were trained during earlier years at this station.

The crop is quite new to many of the farmers of this region and they are unfamiliar with cultivation methods of the crop. At this stage, the Agricultural/ Extension officers from different organizations have important role to play in educating the farmers in this matter. Hence, we are proposing to organize a national level training course from 12<sup>th</sup> to 15<sup>th</sup> September, 2011 on popularization, promotion of wheat cultivars in the non-traditional areas at this station involving Agricultural/ Extension officers.

## **Distinguished Visitors**

Dr. H. Bariana, University of Sydney visited during 16 – 18<sup>th</sup> October, 2010 for undertaking a collaborative research programme on wheat rust resistance breeding.

Dr. Vijay Nayar, Director, Sugarcane Breeding Institute, Coimbatore visited station on 30<sup>th</sup> November, 2010.

## **News**

Dr. M. Sivasamy, Sr. Scientist (Breeding) completed a deputational visit of two months as visiting Scientists at CIMMYT, Mexico. Dr. Sivasamy was highly benefited by upgrading his skills in molecular marker assisted selections and gene tagging techniques during this visit.

Dr. P. Jayaprakash, Sr. Scientist ( Breeding) Participated in the training programme on “*Standardization of stem*

*rust field notes and germplasm evaluation, with discussions on yellow and brown rust.*” From 5<sup>th</sup> – 12<sup>th</sup> October 2010 at Kenya Agricultural Research Institute in Njoro , Kenya.

Dr. Jagdish Kumar, PS and Head undertook 15<sup>th</sup> Management Development Programme in Agricultural Research (ICAR sponsored) during December 2 – 7, 2010 at NAARM, Hyderabad.

Dr. Jagdish Kumar, PS and Head enrolled as faculty member in IARI, New Delhi for post graduate teaching and research in the division of Plant Pathology.

### **Joining/Promotion/Transfer**

Sh. Bhadra Kumar, Assistant got promoted as Astd. Administrative Officer and has been transferred to IARI, Regional Station, Pune.

### **New Project earned**

*Puccinia triticina* genomics network *de novo* genome sequencing, fitness, variation and pathogenicity funded by DBT.