Volume 3 No.1 May – July 2014

Wheat Summer Nursery

e-newsletter

Regional Station, Directorate of Wheat Research, Dalang Maidan,
Lahaul-Spiti, Himachal Pradesh - 175140

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Wheat Summer Nursery (WSN) Lahaul - A Reminiscence

J.P. Tandon
Former Project Director (Wheat)

Wheat Summer Nursery at Dalang Maidan in Lahaul Valley of Keylong District in Himachal Pradesh was **established in mid sixties** immediately after the introduction of semi-dwarf wheat varieties developed by Dr. N. E. Borlaug. It was primarily aimed to meet the requirement of wheat breeders for expeditious advancement of filial segregating generations to speed up wheat improvement programs by raising an additional crop within a period of one year and also to multiply pure breeding lines for rapid entry into yield evaluation trials.

To begin with the nursery was grown by renting land from local farmers and Dr. J. B. L. Mathur used to organize the same. Later the land at Dalang Maidan was made available by the state Government in early seventies. The facility was/is available free of charge to all breeders associated the All India Coordinated Wheat Improvement Program which was then part of IARI New Delhi.

The nursery **was administered by Indian Agricultural Research Institute** till the establishment of independent Wheat Project Directorate at Karnal. Till 1987 materials meant for sowing at the nursery used to be flown by Helicopter from Chandigarh/ Delhi to Keylong through a facility provided by the Ministry of Defence to ensure timely sowings at Dalang Maidan. This was arranged since the road system was not very well developed and Rohtang Pass frequently remained blocked with snow and landslides till end of May/beginning of June which was too late for wheat sowing. However, the arrangement collapsed since IARI did not make the agreed payment of dues for over a period of several years and refused to clear the bills even after repeated requests.

The **Nursery has served its objectives** very well and helped breeders to **1)** advance segregating materials for rapid develop pure breeding lines**; 2)** to make crosses using latest sources of resistance

identified during the crop season as also among elite advanced lines**; 3)** multiply advance generation fixed lines for early entry into yield evaluation trials. An additional advantage of shuttling the breeding materials between nursery and the plains has been**. 4)** rapid and effective screening against stripe rust and powdery mildew for which it is a virtual hot spot and **5)** development of more widely adapted photo insensitive varieties since the crop growth at the nursery occurs under long day conditions while in plains it occurs under short days. The nursery is also being used for several other *rabi* crops such as pulses and oil seeds to achieve the similar objectives.

I first visited the nursery in 1983 along with late Dr. V.S. Mathur who has been visiting the nursery since its inception. He told me that in earlier years the visiting scientist had to carry along with them wheat flour, rice, pulses, tea sugar etc. and other essential consumables as part of their luggage since food was scarcely available locally. The visiting scientist had to stay in rooms rented in nearby village and share food with them. Even at the time of my first visit there were hardly any facilities at the farm except two tents.

It was observed that the place can be **used to intensify Spring x Winter Wheat crossing program** and first set of winter wheat varieties was grown in October 1984 but the crop was completely damaged by animals. Immediately a net house was got constructed and successful crossing program was implemented from 1986 onwards.

There was **hardly any irrigation available** for the crop and the crop has to be raised primarily as rain fed. At sowing some water was available from melting snow from the adjoining hill but this used to dry very soon. The diesel operated pump installed on the river side never functioned. A proposal was under processing to replace it with electric pump which was expedited but it also failed to work for lack of electricity and spare parts. It was observed that there is a fairly large snow fed perennial water fall/spring on the opposite side of the river which could be exploited to irrigate the **farm through gravitational flow** eliminating the problems encountered with diesel/electricity operated pumps. Immediately all efforts were deployed to exploit this source which required clearances from several departments like forests, irrigation etc. which was done and ultimately a reliable source of irrigation water was developed to bring water to the farm.

There were no infrastructural facilities except two tents which housed the operational facilities. The visiting scientists also had to stay in tents or at Kelong in case they had transport with them. Immediately plans were made to construct laboratory facilities, few residences and a guest house which were in final stages of construction when I completed my tenure as PD in 1993.

It was envisaged from the planning stage that the laboratory would have **Wheat Germplasm Storage Facility** to take advantage of the natural environmental conditions. It has been observed that there was no problem of stored grain pests and diseases in the valley because of low temperature and humidity and the seeds could be stored for long period of time without much precautions except physical security. Samples of grains remaining stored with farmers as also at the nursery for several years showed excellent germination. The first set of wheat and barley germplasm for storage was shifted in 1993 and kept in steel trunks. This was necessitated since there was no germplasm storage facility with DWR even at Karnal.

I am extremely happy that now the nursery has well developed farm, irrigation facilities, laboratory buildings, guest house and some residential facilities etc. It is very well serving the purpose for which it was established and helping not only wheat breeders to attain their objectives at a rapid rate but also several other *rabi* crops.

Important Wheat Diseases in Lahaul Valley of Himachal Pradesh

M S Saharan, S C. Bhardwaj and Indu Sharma

Stripe Rust *(Puccinia striiformis)*

Stripe or yellow rust of wheat caused by *Puccinia striiformis* is an important disease of NWPZ and NHZ of India. Stripe rust appears under natural conditions at Dalang Maidan and thus this centre facilitated the evaluation of Breeders material during the off season since its establishment. Timely detection of new stripe rust pathotypes from Dalang Maidan samples has helped in incorporation of stripe rust resistance in popular cultivars before the inoculum reached the main wheat belt of the country. First time PBW 343 virulence was detected on Sept. 5, 2000 at Dalang Maidan in TPN on PBW 343. Later on this pathotype was detected from Batala, Punjab in March, 2001.

Stripe rust

Stripe Rust Pathotypes Identified from Lahaul Valley of HP

Old Name of Pathotype	New Name of Pathotype	Detected from and Year	Susceptible line
L	70S69	Dalang Maidan (1988)	Hyb. 46
N	46S102	Dalang Maidan (1988)	Sonalika, Kalyansona
P	46S103	Dalang Maidan (1990)	Sonalika, Kalyansona

(Kumar *et al.* 1990. *Plant Dis. Res.* 5(2): 221-222; Kumar *et al.* 1991. *Indian J. Mycol. Pl. Pathol.* 21(2): 161-163)

Powdery Mildew *(Blumeria graminis f sp. tritici)*

Powdery mildew appears under natural conditions at Dalang Maidan and thus this centre facilitated the evaluation of Breeders material for powdery mildew resistance during the off season since its establishment. The disease is prevalent in NHZ, SHZ, NWPZ and losses upto 12-45% have been reported. Recurrence of the disease is through wind-blown conidia from hills.

Optimum conditions for conidia germination is 15-20^{o}C temperature, 24-75% humidity at 20^{o}C.

Powdery mildew

Head Scab

***Fusarium* Head Scab (FHB)** *(Fusarium spp.)*

Fusarium spp isolated from Dalang Maidan are *F. graminearum and F. verticillioides.* Pathogenic and genetic variation among *Fusarium* spp. / isolates have been studied (Saharan *et al*., 2003. *Indian J. Agric. Sci. 7*3 (6): 322-326; Saharan *et al*., 2007. *Current Sci.* 92 (2): 230-234; Saharan, M. S. and Naef, A. 2008. *Crop Prot.* 27: 1148-1154; Saharan *et al*., 2010. *Indian Phytopath.* 63 (2): 149-153).

Wheat Disease Monitoring Nursery (TPN)

TPN is planted at Dalang Maidan every year to know change in disease situation under natural conditions vis a vis main wheat belt areas of NHZ and NWPZ, resistance breakdown in wheat in initial stages and the movement /spread of wheat diseases in different areas. Alongwith common set of varieties (WL 711, HD 2329, Agra Local, HD 2160, Lal Bahadur, WL 1562, HW 2021(*Sr26/Sr24*), HD 2204, C 306, WH 147, HW 2008 (*Sr24/Lr24*), Kharchia mutant, HP 1633, DL 784-3 and *Lr24*), zone specific varieties for NHZ and High Altitude Zone (HPW 251, VL892, HS 420, Sonalika, VL 738 and Barley Local) are also planted every year at Dalang Maidan.

Extension activity

Facilitation of Front Line Demonstrations (FLD) for popularizing wheat in Lahaul valley of Himachal Pradesh was done during summer 2014. In the Eight villages of Lahaul valley (Khangsar, Nukar, Jagla, Bargul, Angroop, Dalang and Teeling) 20 Front Line Demonstrations are being conducted to demonstrate the improved wheat variety HS 375 (HIMGIRI) and its production technologies including chemical weed control technologies in wheat. This variety is recommended for very high altitude areas of Himachal Pradesh.

Visit of Dr. R. P. Dua, ADG (FFC) at DWR, Regional Station, Dalang Maidan, Lahaul & Spiti (HP)

Dr. R. P. Dua, ADG (Food and Fodder Crops) visited the DWR, Regional Station, at Dalang Maidan, Lahaul-Spiti, Himachal Pradesh on June 29-30, 2014. Dr. Dua during his visit highlighted the role of this station in wheat improvement programme of the country. Appreciating the work of the staff in such harsh conditions, he promised the support to further strengthen the station. He also interacted with the local farmers and apprised them of the support in the form of farmer trainings for their benefit.

Dr. R. P. Dua, ADG (FFC) at Regional Station, DWR at Dalang Maidan

Dr. Dua Planting a tree at Dalang Maidan

Dr. Dua interacting with local farmers