

Dr. S.P. Kohli,
Project Coordinator (Wheat)

F/SPK-67/25 23.5.67

d.o.no.
Cumming's Laboratory
Indian Agricultural Research Institute
New Delhi, the 23rd May, 1967.

My dear Dr. Swaminathan,

In response to your D.O. letter No. PA/1751 dated 20.5.67 received by me on 22.5.67, I enclose herewith the Parentage, History of selection and Description of the new dwarf wheat varieties viz., S.227, Sona 227, S.308, Sonalika, S.307, Safed Lerma and Chhoti Lerma (S.331).

In case any further information is desired, I will be glad to furnish that too.

With respectful regards,

Encl: Ref. to.

Yours sincerely,

S. P. Kohli
(S.P. Kohli) 23/5

Dr. M.S. Swaminathan,
Director,
I.A.R.I., New Delhi-12.

"Spk:Blal"/

NOTE ON THE ORIGIN, HISTORY AND DESCRIPTION OF
THE NEW DWARF WHEAT VARIETIES, S.227, SONA 227,
S.308, SONALIKA, SAFED LERMA AND CHHOTI LERMA.

Breeding of dwarf varieties was first initiated by Dr. S.P. Kohli, Wheat Breeder at the Indian Agricultural Research Institute during 1960-61 when, some Italian dwarfs, were selected for crossing with the Indian wheats due to the former having very high values of breaking strength of straw, short height combined with high 'pulling resistance offered by plants'. These varieties were crossed with the best Indian wheats. F_2 s of about a dozen such crosses were raised during 1962-63.

During the autumn of 1963, the Indian Agricultural Research Institute, New Delhi also received varied dwarfs breeding material (721 lines) at different stages of development (F_2 to the fixed varieties stages). The dwarfing genes in this material were derived from the Japanese Norin wheats. Part of this material was transferred to Ludhiana (Punjab), Pusa (Bihar), Bhowali (U.P) and Wellington (Madras) for purposes of assessment and utilization in the hybridisation programmes. Almost all of the material at Delhi was given to Dr. S.P. Kohli, Senior Wheat Breeder for further selection and hybridisation work. Only 36 F_7 lines (highest yielding lines at Sonora) were assessed by Dr. M.S. Swaminathan at that time Head of the Division of Botany, I.A.R.I. with the help of his graduate student Shri George Varughese.

Of the material assessed by Dr. S.P. Kohli during 1963-64, a number of promising lines were selected and taken to the Nilgiri Hills by him for further tests and seed multiplication at the Wellington Substation during the summer of 1964. The observation rows data of the Mexican material grown at other centres during 1963-64 were summarised by Dr. S.P. Kohli. As a result of all

too made single plant selections of this variety that have been increased by him under the designation S.227-SAS. The bulked seed ~~from~~ cooperative efforts of the breeding sections at Delhi and Pant Nagar resulted in the comparatively rust resistant reselections of S.227 that was given the name of Sona 227 during 1966. S.307 and S.331 - in addition to S.227, Sona 227 and S.308 have been continuously included as Delhi Centre entries in the Coordinated Trials conducted upto date. Pure-lines selections of all of these strains have been tested and increased for seed and we have now about 300-800 acres for seed under each of these varieties during 1966-67. The performance of all of these strains has been very superior as seen from the data of the Coordinated Trials conducted during 1964-67. At a meeting held in May, 1967 under the chairmanship of Dr. M.S. Swaminathan, these varieties had been given their new designations.

The breeding work of the wheat Section that was being carried-out individually by the participating officers (Dr. S.P. Kohli and Shri P.N. Bahl, Shri V.S. Mathur) was unified with effect from rabi 1964-65 season as decided at a meeting held under the chairmanship of Dr. M.S. Swaminathan. Since then the material and work have been handled as one programme by the active participation of Drs. Kohli, Anderson and Mr. Bahl. The association of Shri V.S. Mathur, Drs. R.K. Miri, J.P. Srivastava and N.N. Roy was unfortunately for very short periods and they settled to their separate items of work. Shri Arya Bhushan and Shri R.P. Singh, Research Assistants had assisted in the Testing and multiplication of the selected material w.e.f. their joining the

this work, he entered the following lines in the different 1964-65 Coordinated Wheat Varietal Trials decided for in August, 1964 and conducted in the plains and hills of India. In addition, the initial seed - increase work progressed side by side of the coordinated testing.

<u>S.No.</u>	<u>Strain</u>	<u>Pedigree</u>	<u>Tests entered into</u>
i)	V.17	(Fn x K58-N) N10-B)Gb-55 - amber seeded.	North-western and North-eastern Plains Zones.
ii)	V.18	- do - red seeded	Uniform Regional Trials, Northern Hilly Zone.
iii)	S.308	(II 53-388 x An)(Yt.54 x N 10-B) LR)	North-western - eastern plains and Hilly Zones.
iv)	S.307	(Y50 x N10-B) L.52) LR ³	North western and eastern Plains Zones.
v)	S.331	(LR 64 (sib) x HUA.R)	- do -
vi)	and a few others.		

S.308 and S.307 (V.17) - though still impure in F_6 and F_7 respectively for a number of plant characters, were judged by Dr. S.P. Kohli to be the most promising particularly, because of their possessing amber coloured seeds. As a superior grain type, S.308 was the best of all the 721 lines obtained from the Mexican Programme. Pure-lines selection work was initiated during summer 1964 and continued till date. HD(M)18427-64-1553 and HD(M)18427-64-1555 have formed the breeders seed of S.308 and the variety has now been designated as SONALIKA.

Dr. N.E. Borlaug was approached by Dr. Kohli for additional quantities of seeds of the amber seeded lines but he could supply only about three kilograms seed of S.227 that was sown and reselected from (by Dr. R.G. Anderson) at Uttar Pradesh Agricultural University at Pant Nagar during rabi 1964-65. Dr. M.S. Swaminathan's results too indicated that S.227 was good yielding. He

breeding section. It has to be recorded that the whole work had been carried out with the help and active interest of Dr. M.S. Swaminathan at that time Head of the Division of Botany, I.A.R.I. Dr. Swaminathan and Dr. B.P. Pal were implementive in obtaining the Mexican wheat breeding material into India through the benovelent help of Rockefeller Foundation and the Mexican Government.

The performance of all of the above-mentioned dwarf wheats has been summarised in the Coordinated Trials Data Summaries presented and circulated at 1964 to 1966 Wheat Workers Seminars. As judged from the observations made on the above-mentioned dwarf-wheats, following characteristics can be attributed to these varieties:-

S.227 (unselected) and Sona 227 (selected seed).

These are two gene dwarfs of medium maturity derived from the Mexican cross viz., (Fn x K 58-N) N10-B)Gb.55-⁸¹⁵⁶~~IL124~~
Sona 227 is expected to be superior in yield, grain-quality, rust and loose-smut resistance. These varieties have done well both under high and low fertility as well as irrigated and rainfed conditions. They do particularly well under timely sown conditions. They are adapted for cultivation all-over the wheat growing areas in the country particularly, under timely sown, irrigated and high fertility conditions. S.227-unselected has already been released by Uttar Pradesh etc. and approximately 800 acres have been given to its seed production during 1966-67.

The variety has fairly long, densely set bold, awned ears and smooth reddish chaff. The grain is small to medium bold, white to amber and semi-hard to hard in texture.

S.308 (unselected) and SONALIKA (selected seed)

2 | These are single gene dwarfs of early maturity and derived from the Mexican cross viz., ((II53-388-An) (Yt.54 x N10-B) LR. III8427 \checkmark S.308 and Sonalika are superior in yielding ability and grain appearance - resembling closely some of the best quality Indian wheats. They have high degree of resistance to all the three rusts but ^{are} lightly susceptible to loose-smut. The varieties have done extremely well under timely and late-sown conditions. They are adapted for cultivation in Haryana, Delhi, Uttar Pradesh, Bihar, West Bengal, Orissa, Madhya Pradesh, Rajasthan, Gujarat, and Maharashtra States particularly, under irrigated high fertility conditions.

This variety has long, lax and bearded ears with smooth reddish glumes. Grain is bold, well-filled amber and hard.

S.307 (unselected) and Safed Lerma (selected)

3 | These are derived from the Mexican cross viz., (Y50 x N10-B)L.52) LR³. These are single-gene dwarfs resembling Lerma Rojo 64A very closely in height, plant pigmentation and other characters such as, medium maturity period and good yielding ability. The main difference, however, lies in the white semi-hard nature of grain of S.307 and Safed Lerma. Resistance to all the three rusts is high and resistance to loose-smut is partial. These varieties are suited for cultivation in the Punjab, Delhi, Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, Gujarat and Maharashtra under timely sown irrigated high fertility conditions. Adequate quantities of seeds of these varieties will be available this year. The variety will find farmers preference over red seeded Lerma Rojo and Sonora 64.

The variety has fairly long, lax bearded ears with smooth reddish chaff. The grains are longish, fairly bold and semi-hard in texture.

S.331 or Chhoti Lerma

(4) | This is again another white seeded two gene dwarf wheat derived from the Mexican cross viz., LR 64(Sib) x HUA.R. The variety is good yielding, medium late maturing and highly lodging resistant. The outstanding features are high degree of resistance to all the three rusts as well as loose-smut. These characters make it particularly suited for cultivation under timely sown irrigated rich soil conditions in the Punjab, Delhi, Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh. Chhoti Lerma also possesses fairly good drought resistance. This variety is, however, not expected to stay in cultivation for long because of less attractive grain. It, however, should receive farmers preference over red seeded Lerma Rojo and Sonora 64 till adequate quantities of seeds of amber dwarfs become available.

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