Dr. Ram Dhan Singh

Family is veritably a cradle of culture and civilization. In India, it is the basic unit of the social, political, economic and cultural psyche of Indian society. It imparts true social education to a man. It is, truely, a mint which moulds and shapes a man. Rao Bahadur Ram Dhan Singh owed much of his nature and attitudes that he had imbibed from his family and the cultural ethos of the rural society in Haryana. Ram Dhan Singh was born on 1st May, 1891 in a Jat peasant family of village-Kiloi, in Rohtak district. His father's name was Ch. Shanker Singh Hooda and his mother's name was Haso. She belonged to village Baroda near Gohana. The names of his grandfa- ther and great grandfather were Ch. Lal Chand and Ch. Sheonath respectively. Ram Dhan Singh had four brothers, namely Dharma, Bhartu, Ratna and Bhagwana and he himself was the eldest among his brothers. His ancestral family enjoyed social status. The family owned 1400 bighas land in two villages i.e. 400 bighas in Kiloi and 1000 bighas in Barota Garhi, si tuated on Gohana-Sonipat road. Both the villages are situated in the richly irrigated and fertile belt ofland.

In fact, it was a large family. Ram Dhan's parents were the residents of Kiloi village. This village is situated about sixteen kilometers away from Rohtak on Rohtak-Sonipat road. It is again on the Rohtak-Sonipat road that there stands Bhalot, a prominent village as native place of Ch. Lal Chand, a feudal lord of great note and a member of Unionist party of Punjab. Raghu, the son of Lal Chand was a business icon of DLF, Delhi. There shoots out a link road on the left side that goes to village Kiloi, situated five or six kilometers away from Bhalot. With a population of 24787 , Kiloi has two panchayats. The village Kiloi is inhabited mainly by Hooda Jats, though Sangwans and Rathees also live in harmony with the Hoodas.

In tune with the prevailing rituals of the society, Ram Dhan Singh was married at very early age. The bride belonged to a Mahra village situated near Sonipat. The village Mahra is inhabited by Malik Jats and it is the native place of Bhagat Phul Singh, a dedicated Arya Samajist. Hence the wife of Ram Dhan Singh, Mamkaur belonged to Malik gotra. She was thoroughly an illiterate woman. She remained in the village Kiloi throughout her whole life. She bore only one son named Bhim Singh.

Ram Dhan Singh received his primary education in his native village. At that time villagers did not know that they had in their midst a child with extraordinary qualities, whose accomplishments in the future would immortalise their village. Later, he joined Government High School, Rohtak. He was a keen student and believed in hard work. He passed his Middle and Matriculation

examinations in 1905 and 1907 respectively, securing very good marks. Rohtak, a city of ancient glorious past and a traditional capital of Haryanvi Jat tribe, is located in the middle of the Jat heart land.

After passing his Matriculation examination, he joined D.A.V. College Lahore (now lslamia College) for further studies. From this college he passed Intermediate class in 1909 obtaining high marks.

After passing the Intermediate class, Ram Dhan Singh joined the Punjab Agricultural and Research College, Lyallpur (now Faislaad) in 1909 in the Three year diploma in Licentiate in Agriculture (L.Ag.), which had been started in the same year. Thus his was the first batch of students of this discipline in the college. The first batch students completed their diploma in 1912. Ram Dhan Singh stood first in this diploma. S. Labh Singh (1889-1962) a course-mate of Ram Dhan Singh was also bracketted first. Like Ram Dhan Singh, he was also awarded the title of 'Sardar Sahib', Sir MaynardGanga Ram award, a gold medal from Pakistan Government and honour by P.A.U. Ludhiana later on!4)

First Posting At Pusa, Bihar

The students of the first batch, who got the diploma in Licentiate in agriculture in 1912, were expecting at least a grade of Rs. 100-1 0-300 in the government service. They had been promised to be placed in this grade. But, they were offered a starting salary'of Rs. 401- p.m. They all decided not to accept this low salary. Later on, many of his batch-mates relented and joined at this salary. But RamDhan Singh did not bow and stuck to his guns. So for some- time he remained in his native village. After a period of two years he got a chance and joined the Imperial Agricultural and Research Institute, then situated at Pusa in Bihar, in 1914 in higher grade as a Research Assistant. At that time it was the principal seat of agricultural research in India.

Wheat breeding work was planned to produce good quality and high yielding wheat strains to meet out the demands of the country. But the process revealed that the growth of wheat strains suffered because of the impact of some diseases and other pitfalls. Accordingly, systematic and regular work on breeding high yielding varieties of wheat showing resistance todraught, diseases, (rusts, smuts), pets, etc. first commenced at this institute in 1935.

Sir Albert Howard and his wife G.I.C. Howard, the pioneers in plant breeding, worked with exemplary dedication and commitment in the Imperial Agriculture Research Institute PUSA, Bihar. Ram Dhan Singh had the privilege of working for five years with this devote couple and with a band of other dedicated scholars. The institution was indeed a premier research centre having a galaxy of

remarkable scholars and scientists who were working with unparallel dedication sincerity. Ram Dhan Singh, who, was a scholar of serious nature also followed silently the path of these people. As such, he very lucky to have an inspiring company of dedicated people in renowned institution.

Company moulds a man stupendously. But hard labour chisels man into an expert. It even defies the hereditary law. Ram Dhan Singh followed the path of hard labour in the company of extraordinarily dedicated couple and was influenced by the conducive environment of the research centre. Here he developed a keen interest in plant breeding which became an abiding passion for him leading to development of the improved varieties of the crops. The budding talent found an opportunity to flower. adopted this path with rare passion and sincerity which became milestone in the formation of his glorious career. He adhered to this path throughout his life and achieved remarkable success.

The earning and learning of Ram Dhan Singh went together in this august institution. He passed his Bachelor of Science degree in 1919 from Patna University. This further enhanced the calibre of this serious youngman. His research-oriented instinct that developed in the company of Howards, paid him rich dividends in his long life. Verily, this was not an interlude, but necessary first step in the formation of his carrer. At the same time it is also true that 'out of past, is the future built, so look back as far as you can'. Ram Dhan Singh deeply looked within and continued looking at his past, out of which he built the future in agriculture, not of his own, but of the whole peasantry of the country in particular the whole humanity in general.

Leaving his individual case aside we want to draw the attention of the people to the maxim, which is true to our history. So long as the people forgot the past, the Hindu nation remained in a state of stupor, and as soon as they have begun to look into their past there is on every side a fresh manifestation of life. It is out of this past that the future has to be moulded, this past will become the future.

Study at Cambridge (London)

When Chaudhry Ram Dhan Singh was working at Pusa institute, an incident, which had in its womb a gift for him occurred He was absolutely sincere to his duty and work assigned to him. He was working under the most devoted Howard couple. One day drizzling started in the night. The wheat seed was sprawl out on the open ground for research verification. Generally it was covered with an iron jali, so that the animals and birds might not eat it. Unmindful of the drizzling, the Howard couple rushed to the site for collecting and placing the wheat seed in a

safer place. As soon as they reached the place, they found that Ram Dhan Singh, all by himself was collecting the seed in sacks and carrying the same on his back to a safer place. Howard got overwhelmed at the intense sincerity of the man. By that time Ram Dhan Singh had also passed his B.Sc. degree from Patna University. To test his sincerity further, Howard offered him a piece ofland of the field for the development of wheat crop without any help. Ram Dhan Singh belonged to the Jat peasantry, a traditional agricultural clan, known for his valour and dexterity of agricultural profession. So doing each and every thing, even cutting the crop himself, he performed his duties most satisfactorily. Howard became exceedingly glad at his performance and thought that the man was a real genius and utmost sincere. So Howard himself took a keen interest and recommended his case for fellowship to study at Cambridge in London. In 1919 he proceeded for his higher studies to Cambridge, a traditional bastion of education for the English upper classes. Cambridge was the most famous agricultural research centre of the Commonwealth and a great centre of learning and creativity at that time. From this university he earned his M.A. degree in Natural Science (Tripos) and also Diploma in Agriculture in 1922. He did not borrow any other loan from any one and met the expenses from his own resources.

After coming from Cambridge, he remained in his native age till he joined a post of Fodder Specialist in 1925 in Agricultural College Lyallpur. As he belonged to a well-to-do family, he never thought of joining any post of small cadre. During this period of two or three years, he somewhat led an isolated life and remained busy in research work in the field in his own way and also used to spend two or three hours daily on the shore of village pond and kept himself absorbed in throwing pebbles on the surface of water. He used to enjoy this game and became happy at the pebble which was thrown at its farthest distance. It was because of such an activity that the people of the village observed that Ram Dhan Singh had come **bawla** (mad) after having read so much in England. In fact, Ram Dhan Singh, by birth, was a shy and reserve person.

The Punjab Agricultural College and Research Institute, Lyallpur, established in the undivided Panjab, which Dr. Ram Dhan Singh served as a scientist and subsequently as a Principal, was a premier institution of India. It came to acquire international recognition with the passage of time, mainly because of the quality of its teaching and research pursued by its competent faculty. Situated in the midst of richly fertile land, it developed into a paramount centre of agriculrural research and progressive farming, besides emerging as a nucleus of upcoming agriculturist elite, mixed culture and political awakening.

People generally attain prominence from their associations with great institutions but it is equally true that institutions become widely because of their association with men of calibre. Both the institutions and their products mutually contribute to recognition and honour. The situation is quite different in the case of Agricultural College Lyallpur. Both the college as well as the alumni are great because of their individual pecularities. That is why alumi have not forgotten this august college. The great institute provided facilities and scope which Ram Dhan Singh availed of to dominate the field because of his unrivalled research and educational work. Hence he became a synonym for the institution. A detailed summary of his research work and other activities is mentioned herewith.

Ram Dhan Singh who was M.A. (Cantab) and was working as a Fodder Specialist since 1925 in the college, was appointed to this newly created post. Thus he was the first person to occupy this prestigious post. We see that within a period of less than one year's service as Fodder specialist, he was transferred as Cerealist. He remained saddled for more than two decades with this important post and performed manifold rudimentary as well as fundamental important activities i.e. formidable administration work, unparallel research work, judicious admission work and most necessary extensive and constructive deeds etc. He held this post of research work till his superannuation in 1946, when alongwith this position as a Cerealist, he also became the Principal of this premier college. Thus he remained absorbed in both the prominent posts till his retirement in May 1947. He served as Principal from 1946 to May 1947, just on the eve of Independence, and at the very fag end of his career.

Surprisingly, Ram Dhan Singh used to work day and night. He used to embark upon his work all alone at mid-day in the scorching heat, and found time to work with calm, deep and steady mind. Heat was alien to him. He would identify himself with nature and plants in toto. At last his arduous labour culminated in the production of many potential and famous wheat varieties like Pb C-51S, C-591, C-228, C-250, C-217 etc. and a host of other varieties of other cereals. The college became the principal centre of botanical research, specially on the wheat crop. Another scientist Lal Singh (1893-1963), a contemporary of Ram Dhan Singh, also joined as first Fruit Specialist to the Government of India at this Punjab agricultural College Lyallpur in 1926 and continued on this post till 1944. He revolutionised the horticulture with deep interest. Indeed a new class of brilliant plant breeders and agricultural scholars cropped up at the healthy premises of this august college. The institution became a new realm of creativity for the budding agricultural scientists. In addition, the college gave a new upsurge to the rural youth of middle class peasants of the erstwhile Punjab state. As a result the sons of the soil emerged as the agricultural elite in the state.

The college was humming with intelligent, dedicated and committed staff. In addition to it, the college was a great nucleus of mixed culture i.e. Hindus, Muslims and Sikhs. Basically the college was filled with healthy. Competition pertaining to research and education Mr. Perceval E. Lander a Chemist of the first order, was in the department of Chemistry. Ch. AZmat Singh who belonged to Ut tar Pradesh, was a high standing research officer. Bhai Balmukand of Kamalia near Lyallpur, a well known Arya Samajist was the Professor of Physics. All of them were very close to Ram Dhan Singh.

Interestingly, under the serious leadership of Ram Dhan Singh, the research work and agricultural education accelerated in a phenomenal way, because he involved himself in research work with great fervour. So from 1940 onwards emphasis was laid on plant breeding on regional basis, in preference to the centralised basis. As such, the Cereal section located a number of sub-stations in the important wheat growing regions of the state i.e. Rawalpindi in 1937, Gurgaon in 1940, Gurdaspur in 1941, Kulu in 1945 and Jullunder in 1947. Ram Dhan Singh was mainly instrumental in the opening of these centres. These units had also begun to playa very useful part in research activities and also in the increase of production, each catering to a definite set of climate and soil conditions. In addition to it he was pioneer in starting an off. season nursery in Lahaul valley, Himachal Pradesh in 1932. Undoubtedly, the credit for these things goes to Ram Dhan Singh.

With a view to expediting evolution of improved varieties of rabi cereals (viz. wheat and barley) two crops a year are being raised since 1934; a normal crop was taken in plains during winter and another was raised during summer in the Lahaul valley in Kull sub-division at the elevation of about 10000 feet above sea-level. By this arrangement, the plant breeding work was greatly accelerated because the time taken for the evolution of a new variety was almost reduced to half.

Rapidity and efficiency enhanced the scope of Cereal Section. To begin with, this section was entrusted with the improvement of cereal crops, primarily wheat, barley and rice. A few years later work on mash, mung and lentils was also entrusted to the Cerealist (now Cerealist Botanist). Maize research work was also transferred to this section in 1945. At the time of partition, work on gram and tobacco also fell to the lot of Cerealist Botanist. Thus this section was now handling wheat, rice barley, maize, gram, bajra, mash, mung and lentils .Now it was dealing with cotton and oilseed crops also.

We see that under the able stewardship provided by Ram Dhan Singh for twenty years, this section made rapid advances. The section dealt with research

work of the most important and major food grain crops meant both for human being and animals consumption, and evolved a large number of improved varieties of wheat, barley, rice and pulses. Since Ram Dhan Singh came of a traditional agriculturist family by birth, he very well understood the anatomy of peasants' social psyche and the state of agriculture in India. Consequently he always had in his mind the lingering shadow of the man behind the plough.

Ram Dhan Singh devoted his whole life to agricultural research. Like legendary archaeologist H.D. Sankalia, who nurtured through his missionary zeal and personal efforts, the Deccan College Pune (renamed in 1864), which blossomed into a Mecca of inter disciplinary research activities, Ram Dhan Singh also nurtured the institution and the profession with exemplary dedication and commitment. The college became a prominent centre of cerealr earches. It was the popularity of the college that made the city of Lyallpur a leading intellectual, political and commercial centre of the undivided Punjab.

Ram Dhan Singh was a man of a few words and a few needs. He led extremely an austre life. He was soft-spoken but full of meaning. Virtually he was wedded to research. He worked in this field of agricultural research with single minded dedication, intense sincerity and phenomenal hard work. He had an extraordinary insight into wheat breeding. He used to go on foot to his experimental fields early in the morning and again in the evening every day, even on holidays and used to examine thoroughly and carefully the performance of all crosses and selection of the crops he handled.

Being a genuine and genius cerealist, he maintained excellent germplasms. With his persistent, bright and brilliant efforts, he developed nine famous improved varieties of wheat, eight of paddy, five of barley and three of pulses.

The exhaustive detail of the varieties evolved by Ram Dhan Singh are mentioned below :-

Wheat

C-518

This was the first wheat variety which was derived from the cross of Punjab Type 8A and Punjab Type 9 and was released in 1933. It was relatively a short-statured (dwarf) variety, having stiff-straw and resistance to lodging. It was best suited to rich lands with plentiful supply of water and manure. Its dense ears were fully bearded with black awns. The glumes were white and densely felted. The grains were hard and amber-coloured with a tendency towards mottling. The

variety was of a medium late maturity. It was very susceptible to rusts and loose smut. It was recommended for rich soils in the Punjab, Northern Rajasthan and western U.P. It gave on a departmental farm at Lyallpur a yield of 56.4 maunds of grain per acre, the highest recorded in united India and on a Zamindara's Farm (at Montgomery) an average yield of 47 maunds, per acre on an area of 12 acres. Thus it was understood that this yield had broken all records for wheat in India . In the year 1949-50, it gave an average yield of 32.1 maunds of grain per acre from a block of 16 acres under it on a rich land under rainfed conditions at Nagla (Karnal). Besides, its markedly enhanced yields on good lands, it also permited of the use of the reaping machine and therefore of economy in harvesting. It is probably for this latter reason the C 518 was so favourite a wheat on large-scale farming estates, there being 4800 acres under it in 1935-36 on one single estate viz., B.C.G.A. (Khanewal)

Dr.D. W. Kent-Jones of Dover, England, a well known Cereal Chemist, to whom some samples of C 518, C 591, 8A and 'local mixture' were sent by the Lyallpur Ganesh Flour Mills, his opinion about C 518 was that "The more Indian wheat of this nature you can have the better ……. Better than the majority of Indian samples, taking every thing all round. The baking of flour from this wheat with a little more malt to mellow the gluten still further and make it more stretchable would result in pleasing bread."

Interestingly, later on in 1951-52, this varietyproduced 71.58 maunds of wheat per acre on fertile land in Ludhiana district.

Dr. Ram Dhan Singh was, indeed, a fore-runner of the 'Green Revolution.' We may refer to the comments of eminent agricultural scientist on his contribution made towards his high yielding varieties. Dr. Mukhtiar Singh (Retd.), Director, C.P.R.I. Shimla quotes with full authenticity as under –

> "I feel the 'Green Revolution' in India which was ushered in by Dr. Borlaug's semi-dwarf dwarf Mexican wheats in mid 1960s, could be anti-dated by Rao Bahadur's C 518, if fertilizers and threshing machines were available earlier, concomitantly. Rao Bahadur was fully conversant with the association of dwarfing character with non-lodging behaviour in cereals, as early as 1930s."

C-591

This C 591 was the second most important variety, development by him from the cross Pb type 8B and Pb type 9 and was released in 1934. This was of a high-yielding strain with bold, lustrous, amber, hard grains and medium size and was one of the very successful wheat's evolved by the department. It was is fully

bearded wheat with black awns and white felted glumes. It was attractive with excellent chapatti-making quality. The protein content was 10.9 percent. It was medium in maturity and is primarily recommended for normal sowing. It withstood lodging fairly and as such does very well under high soil fertility conditions also. It was susceptible to all three rusts (especially to stem and leaf) and loose smut. It was like C-518 but the glumes ware a little less hairy and the straw weaker than C-518.

This variety was the most popular wheat of the Punjab. It commanded about 80 percent of the total area under wheat in the Punjab, and was also grown extensively in Uttar Pradesh, Northern Rajasthan and Madhya Pradesh.

On account of its attractive amber colour, it fetche a premium over other wheat varieties in the market. In chapati-making properties, this wheat was unrivalled in the whole of India.

This variety gave the best performance when sown at normal time under irrigated conditions. In hundreds of tests conducted under these conditions against 8A (which was the best improved wheat of the Punjab upto the year 1934), the average excess in favour of C-591 was founded to be 2 maunds of grain per acre, but instances are on record where it had out-yielded 8A by over 6 maunds of grain per acre. Several instances were also on record where an average yield of 25 mds of grain per acre was obtained from C-591 on big blocks of land, ranging from 150 to 200 acres. In the eyar 1949-50 it gave an average yield of 19.85 maunds of grain per acre from a block of 1052 acres under it, even under rainfed conditions at Government Reclamation Seed Farm Nagla (Karnal), where this variety was grown in a riverine tract.

Further, wheat C-591, on account of its pearly and rounded appearance of kernals and excellent chapatti-making quality fetched a premium of Rs. 4 per maund even at that time and later on upto Rs. 7 per maund over the Mexican wheat (a maund 3\8 quintal).

C-591 was the greatest success and had a remarkable and phenomenal career, within so short a period of its release in 1934, it had eclipsed all the old and the newer improved varieties. On account of the excellence of its grain and good yielding capacity, there sprung-up such a huge demand for its grain, both for the seed and consumption, that available supplies hitherto proved unequal to the demand. In the matter of premium in price, C-591 had acquired a legendary fame. Its fame had travelled for beyond the boundaries of the Punjab. It would appear that C-591 would have a field of utility throughout India.

The popularity of C-591 went from strength to strength and seed of this variety was in enormous demand in the ordinary market. It continued to command a definite premium in price over other varieties. A special feature of the C-591 crop of 1939 was the number of reports which were received regarding the remarkable extent to which it withstood the stem rust disease which attacked late sown wheats. Dr. Heinrich, a well known welfare worker, in an article contributed to the press, estimated that in the 150 villages in the locality in which his activities were concentrated, this wheat, owing to its disease-resisting quality, obtained for the cultivator an increased yield value at Rs. 5 lakh. So much so, by 1952-53 it had covered about 80 percent of the wheat area of the state. It also spread to other states, such as Uttar Pradesh, Rajasthan, Delhi and parts of Madhya Pradesh.

By virture of their high yield and good grain quality, some varieties, particularly C-518 and C-591 were being grown in 80 per cent of the total wheat area in the canal colonies of the United Punjab, but their spread in the thirteen districts constituting Punjab (India) was lesser scale (not more than 33 per cent of the total wheat area). This was mainly due to the fact that seven out of the eight farms which had been established by the Agricultural Department for the multiplication of improved seeds were located in the portion which had been included in the West Punjab (Pakistan) and only one farm viz. at Abohar had been set apart for supplying improved seeds to the thirteen districts constituting Punjab (India).

Both these varieties of wheat became firmly established as commercial varieties of the province and these, in particular, the better one (C-591), almost replaced the old, hitherto very popular Punjab 8A. Their principal role in the experimental plots of the Cerealist's section now was that of standards by which more recently evolved new wheats were compared.

According to the estimates of Department officers, it was considered that of the whole wheat crop in the province, 50 per cent of the area consisted of improved varieties (C-591 and (C-518) in a high degree of purity, whereas most of the remaining area was also under improved wheat but of a less pure quality. The outstanding feature, however, was the rapidity with which the two newest wheat's had spread. During the year 1939, over two million acre was believed to be covered by C-518 and C-591. The spread to such an extent in a short period of four years since they were placed on the approval list of seed distribution, and bearing in mind that during the first few years the quality of seed available was strictly limited, was a truly remarkable achievement. Although C-518 produced higher yields per acre on rice soils than C-591, the latter variety continued to be more popular both because of its high eating qualities and of the better price

which it command. It was believed that this area under this variety at present was not less than two million acres. The wheat of this variety continued to fetch a premium in the market. The Okara daily market intelligence quoted for it an average of at least two annas a maund over other varieties. It absorbed 69 percent water. The dough was creamy, medium-strong, non-sticky, rapid and full, soft and pliable, and sweetish. This variety C-591 continued to occupy the largest area, under single crop in sowing till 1965.

These two varieties released for general cultivation, were widely cultivated not only in pre-independence Punjab, North-Western Frontier, Sind, the then United provinces (now Uttar Pradesh), the then Central Provinces, Rajasthan and Gujarat, but also crossed the nation frontiers so as to reach Canada and Mexico. As a result, Ram Dhan Singh shot into fame and won not only nation wide acclaim, but also earned global standing. His name became household word in the province.

Befitting with his stature, Ram Dhan Singh was awarded a title of Rao Sahib on 9th June, 1938 for his distinguished and sincere services in agricultural research and education and agricultural development. At this time a medal was also presented to him in this respect which is still available with his grandsons.

Prize for Innovations in agriculture

While organizing his charitable donations, Sir Ganga Ram did not forget his first love, agriculture, and endowed a prize of Rs. 3000 to be given every three years for the inventor of any practical method of increasing the profits of agriculture in the Punjab.

The fourth award of this triennial prize of Rs. 3,000 was made during the year 1939. It was awarded in open competition throughout the world for a discovery or an invention or a new practical method which will tend to increase agricultural production in the Punjab. For the award for this triennium ending 1938, fifteen entries were received. They covered a wide range of variety of subjects of which the most important were the production of improved varieties of crops, the design of improved implements and water lifts and the reclamation of Kallar soils.

After careful examination of all entries, the Managing Committee unanimously awarded the prize on this occasion to Rao Sahib Ch. Ram Dhan Singh, Cerealist, Punjab Agricultural Department, Lyallpur, for his discovery of the two new Punjab wheats C-591 and C-518 which as stated earlier in this report, was the most keenly sought of all the improved seeds distributed by the Agricultural Department.

It is of interest to note that of the four awards of this prize made by then three were won by members of the Punjab Agricultural Department.

Past experience had shown that when the competition for this prize was open to government servants, private individuals had little chance of securing it, as the entries of officials for discoveries made in the course of their official duties and with the resources of government at their disposal, had been consistently of very much greater merit than those of non-officials who had to rely on their own resources. In order, therefore, to encourage non-officials to put forward their best efforts, the Managing Committee decided as an experiment that the existing regulations for the prize should be altered, so that in stead of a prize of Rs. 3000 awarded triennially in open competition, as at present, the award should be made on the next occasion after an interval of two years only, with the prize of Rs. 2000 only and the competition was limited entirely to non-officials. Two years later the next prize of Rs. 2000 will be open to officials and non-officials alike and this alteration will continue every two years thereafter.

Varieties Evolved

The varieties evolved by Rao Bahadur Ram Dhan Singh before and after his retirement can be grouped together under climatic and cultural conditions of the land for which these varieties were recommended for cultivation. The details of these varieties are given below.

1. C-273

It was one of the latest strains which was bred from the crossing of C-591 and C-209 and was released in 1957. In trails carried out on the various departmental farms, it had been out yielding both C-518 and C-591 on soils of average and high fertility, respectively. It had very uniform shining and plump grains and good chapatti making qualities. It was recommended for cultivation in the Central zone under all conditions of sowing except for late sowing. In addition, it was also found suitable for cultivation on soils with moderately high fertility in the sub-mountain region. The ears of this variety were fully bearded with white, pubescent glumes, awns black, grains hard, amber, bold, attractive and less liable to mottling, plant medium tall with good standing ability. Tillering good, maturity medium late, it was more resistant to lodging than C-591. So it was the likely successor to C-591 in the plains of Punjab. C-273 showed fair degree of field resistance to yellow rust and tolerance to black and brown rusts. It was susceptible to loose smut. It was recommended for cultivation in east Punjab also. On an average it had given 937 kgs of grain yield per acre. On cultivators' field, it yielded 762 kgs per acre.

The flour absorbed 68 percent water. The dough was very attractive, creamish, medium-strong and non-sticky. The dough handling property was very good. The chapatti was creamish, soft, silky, smooth and very sweetish. Keeping-quality, in general, was good (although was trend is to become slightly stiff). In general, C-273 was superior to C-306.

C-281

This strain was developed from the cross of C-591 and NP-4. It was released in 1955. C-281 was fully bearded with medium-long, lax ears, glume white and pubescent, awns black and spreading at the time of maturity. Grains bold, hard and amber-coloured, they were lustrous and very attractive. Plants were medium tall with moderate tillering. Maturity was very early. The variety was susceptible to rusts and loose smut. It was approved and recommended for cultivation under all conditions of sowing for South-Eastern zone of the state (Hisar, Gurgaon and Rohtak districts) where hot weather set in earlier than usual. It also did well around Delhi. It was suited for soils of average fertility and barani lands and suitable for late sowing also. It had out-yielded the previous variety C-591 by a margin of 80 Kgs (2.22 maunds) (10.63 %) of grains per acre.

It had good chapti-making properties and nutritive value. It was also similar to C-273 for all dough and chapti characters. As for the keeping – quality, this variety was superior to C-273. In general, it was superior to C-306. It absorbed 68 percent water. The dough was creamy, medium strong, pleasing and non-sticky, soft and pliable and sweetish (better than C-273).

C-253

This variety was developed from the cross of 25C and PN165 and was released for cultivation in 1948. It was beardless wheat with white, glabrous glumes. Grains were hard, amber, bold and of medium size. Maturity was medium late. Easily threshable, it was fairly resistant to yellow rust and loose sumt in the filed. It was susceptible to black and brown rusts. It was approved variety for cultivation in the hilly areas of the Punjab except very high altitudes. It was suited particularly for humid hilly tracts of Kangra. It was liked in the hills due to its easy threshability.

It absorbed 67 percent water and had good nutritive value. The colour of the dough was creamy, mixing behavior-medium-strong, slightly pliable, handling property-slightly sticky, puffing-full but gradual, after baking-soft and pliable.

C-285

This variety originated as a selection from the cross C-288 x B256 G and was released in 1960. B256G was a stem-rust resistant wheat from Kenya. C-285 was a fully bearded wheat with mid-long, lax ears. The glumes were smooth and white. The grains were bold, hard (flinty) and amber-colored. It was slightly earlier than C-591 in maturity . It was highly resistant to yellow, black and stem rusts and was early ripening. This was recommended for cultivation under all conditions in Lahaul and Spiti district, where it was grown as summer crop. It had been found suitable for cultivation at high altitudes viz 1000 ft. and above. It gave about one and a half times the yield of the local variety. Thus this wheat was fast replacing the local strains in the Lahaul valley in the Punjab.

It absorbed 69 per cent water and had good nutritive value. The dough was creamy, medium strong, pleasing, non-sticky, soft and pliable.

C-217

C-217 was derivative from the cross C-518 x C-517. It was released for general cultivation in 1944. It possessed short, compact ears and straw like C-518. But unlike C-518 it was well suited for cultivation under rainfed conditions. C-217 was mid-late in maturity like C-591. It was fully bearded with white, felted glumes. The grains were hard, amber-coloured. It was fairly tolerant to black rust. This variety was recommended for cultivation for barani sowings in the sub-montane areas of East Punjab. (Ambala district). As it had done exceedingly well under barani conditions of Ambala district, it was considered to be the future barani wheat of this district replacing 9D. It had also given promising results under barani or moisture shortage conditions at Gurdaspur and Jullunder and thus out-yielded the best varieties.

6. C-228

C-228 was a selection from the cross between Punjab Taype 9D and Hard Federation, an Australian variety. It was released for cultivation in 1940. It was good for late sowings and irrigated conditions in Punjab. C-228 was full bearded with lax ears and smooth, white glumes. The grains were very bold, hard, amber-coloured, attractive and were of good baking quality. It compares well with wheats from Manitoba which were known for their superior baking quality. Maturity was early. Straw was weak. Fairly resistant to stripe rust. This variety was as good as C-591 in chapti-making qualities but is superior to it bread-making qualities. AS it was very early ripening variety, so on this account, it gave the best performance under late sown, irrigated condidtions. It was remarkably resistant to yellow rust.

7. C-250

C-250 was a sister selection of C-228 developed from cross Punjab type 9 Dx Hard Federation. It was released for cultivation in 1944.

The strain was readily distinguished from the other wheats by its glossy appearance during early stages of growth. It was fully bearded with smooth, white glumes. Grains were hard, bold and ambercoloured. Maturity medium late, straw was weak. It was susceptible to black and brown rusts but fairly resistant to yellow rust and was moderately susceptible to loose smut.

The variety was recommended for cultivation in the Gurdaspur and Kangra district of East Punjab, where high humidity prevailed. Under such conditions it had outstandingly and consistenly out-yielded all other wheats under all sorts of conditions, viz, irrigated and unirrigated (rainfed) and timely sown and late sown. On an average it gave grain excess of 2.40 maunds per acre over C-591. In milling and baking qualities, it was as good as C-228 and formel excellent chapaties.

Rao Bahadur Ram Dhan Singh was a research scholar of outstanding merit. He remained occupied with the scope of research. Region, climate, soil, irrigation and demand etc. remained supereme factors in his mind while he was engaged in research work. That is why out of nine, he himself evolved four wheat varieties i.e. C-250, C-253, C-217 and C0285 for the hills of the Punjab. Besides, he always gave high priority and emphasis to grain quality, chapti-making qualities, grain yield and quality of wheat straw (Bhusa). His relentless efforts, which continued till death, gave birth to nine famous varieties of wheat like C-518 (1933), C-591 (1934), C-228 (1940), C-250 (1944), C-217 (1944), C-253 (1948), C-281 (1955), C-273 (1957) and C-285 (1960). It is surprisingly heartening to note that four varieties C-253, C-273, C-281 and C-285 were released by him after his retirement. Investigations on plant diseases were taken up at the Institute with the appointment of Economic Botanist in 1907, but independent Plant Pathology Section was not created till 1947. So the work on disease resistance into improved Punjab wheats was taken up from 1953 vigorusly. He also did his research work keeping this thing in his mind.

In addition to it, he always laid great emphasis on the quality of seed to be supplied to the farmers under his own guidance. What a love he bore to agriculturists, agriculture, research and the country.

In appreciation of his continuous research work, good educational activities, establishing useful plants and increase in production even during the period of economic crisis, Rai Sahib Chaudhary Ram Dhan Singh Cerealist was

awarded by the Government a title of Rao Bahadur on 2nd June 1943. A medal in this context was also presented to him which is still in possession of his grandsons.

It is a thing of great honour that these varieties remained very useful for many decades. Even today his varieties form the basis of modern research work in plant-breeding pertaining to wheat. In chapati-making, the varieties C-281, C-273, C591 still dominate and are superior to C-306. The Punjab wheat C-591 was taken as the standard wheat.

The wheat varieties developed by Rao Bahadur Ram Singh remained, even after partition, very popular. About 10000 maunds of pure seed of improved varieties available from the year 1948-49 crop, was multiplied further on all the departmental farms during rabi 1949-50. Apart from this about 46 250 maunds pure seed of improved varieties, particularly C-591 and C-518, procure with the help of Civil Supplies Department was distributed to farmers for sowing in 1940-50. Side by side with the opening of new seed farms and distribution of pure seed on large scale, legislative measures like "Pure Seds and Seedlings Act" was enacted in the state, under which it became compulsory for the farmers to grow only those varieties which were recommended by pure seeds sowing roughly about 60000 acres in ten districts during 1949-50.

We may mention with legitimate credit that at one time more than 80% of the wheat sown in Punjab and Western Uttar Pradesh were covered by the varieties developed by this revered man.

Sir Percy W.Marsh, Chairman, Joint Public Service Commission, Punjab and N.W.F.P. in forties said, inter alia, in his speech delivered on the occasion of Annual Prize Distribution of the Punjab Agricultrulal College, Lyallpur that Stalin (1879-1953), Russian dictator, would have the greatest respect for Rao Bahadur Ram Dhan Singh who had done much good work for wheat production in the province by the evolution of wheats C-518 and C-519."

It is an added proof of his achievement when Dr. M.S. Randhawa, an internationally reputed personality and a versatile patron of art reviewed the history of agriculture in Punjab and stated that out of 93,000, 139 acres (37,635,856ha) of land under wheat cultivation, one third was under C-591 a variety developed by Dr. Ram Dhan Singh.

Verily, agriculture was in the blood of the son of the soil. He had a consuming passion for its improvment, development and production. He had an inexhaustible fund of patience and indomitable perseverance. His unlimited capacity and zeal to work set higher and higher records of accomplishments in divergent fields. He was, indeed, a consummate researcher. He was, therefore, highly respected and widely known for his enormous industry, devotion to duty and untiring patience. Known for his hard work, systematic approach to problems and keen eyes to selected the right plant material, Rao Bahadur was known widely as a hard task-master and a difficult person to satisfy.

Perhaps one of his last contribution to scientific pursuits was a co-relation study in wheat.

His varieties were initially developed for Punjab but they be-came popular in other parts of India also. His research contribution to the crop improvement which eminently paved the way for enhanced production in those days, also served as most cherished genetic resources for further development. Thus we see that he made solid contributions to crop improvement. Till today, there is no purallel to the quality of wheats and rice that he evolved.

His work on disease resistant breeding programme in wheat and some other crops is internationally recognised. This noble man who occupied the seat of Cerealist in 1926 in the Depatment of Agriculture, and started remarkable extensive varietal hybridization work for the development of improvent wheat varieties is very difficult to forget. Indeed, it is on the basis of his achievements in the wheat production and productivity that the states of Haryana and Punjab laid strong foundation of wheat breeding work. For all this, he is still remembered very fondly by the farmers as well as the scientists of India. He became a beacon light and a perennial source of strenght and inspiration for the new generation and new breed of scholars of the modern age.

Milling and Baking Laboratory

Upto 1939 Ram Dhan Singh had established his credentials as a resercher par excellence. Gifted with a research oriented nature, he loved all those things which were useful in the arena of research. He pioneered the established of aModern Milling and Baking Laboratory under his own guidance. He took the initiative in 1938-39 for the first time in India. He was solely responsible for its establishment. It was started for the purpose of testing the milling and baking quality fo wheat varieties. Besides, the usefulness of the plant was many-sided. This was probably the first laboratory of its kind in the whole of Asia. It enhanced the status fo the college, state and the country. It accelerated the

research and commercial activities in the state and the country. Practically, it completed the facilities for the early testing of the milling and baking qualities of new wheats. Thus the plant was of a great historical importance, because there was no other way to determine the value of any wheat except in this manner and India had no arrangement for carrying out technological tests on the milling and baking qualities of cereals. Samples had to be sent to England for testing. It solved the profoundest problem of the country. This plant was raised with the financial help of the Imperial Council of Agricultural Research, N.Delhi and the Punjab government. The purpose and usefulness of the plant is described in brief:

This Cereal Technological Laboratory was indispensable because it was in fact very closely associated with the research work on wheat, which was mainly concerned with the evolution of high-yielding disease resistant varieties. It was the question of testing their suitability for the miller and the baker. To get information on this aspect, this Milling and Baking Laboratory was set up in the college, which performed the very important function of carrying out detailed milling and baking tests on new wheats evolved in the Punjab and other provinces of Inda and supplying reports, thereof to the wheat breeders concerned. Prior to the establishment of the laboratory, the wheat breeders all over the country had to send their wheat for all kinds of testing to England, which involved great expenses and time.

A certain amount of research work was also carried out in this labouratory on several important aspects such as finding of the effect fo different manurial, irrigational and sowing date treatments on the protein percentage, extent of mottling in grains, and milling and baking qualities of wheat, and the study of relative value of wheat atta prepared by power-driven stone chakki and hand chakki and gharat as regards its vitamin content, etc. Very important results of great practical utility were obtained from these researches.

As a measure to meet the food requirement of the country during the war and periods of acute shortage of food, the possibilities of mixing flour of sweet potatoes, ground nut cake, soyabean, barley, jawar, bajra, mash and mung with wheat flour were studied and mixable proportions of these subsidiary foods determined. The results obtained from this study were extensive disseminated in the country by the government of India during the duration of World War-II.

A short course in home baking was imparted in the laboratory in which instructions were given in the manufacture of bread, rusks, cakes, biscuits, pastry,

etc. This course was very popular and was largely attended by both men and women.

One outstanding achievement of the laboratory was the manufacture of baker's yeast of good quality, which had formerly to be obtained from England. Starting from a scratch, the laboratory supplied not only its own needs but also hundreds of pounds of both fresh and dry yeast to medical firms and milling and baking concerns in India." Chaudhary Ram Dhan Singh and co-worker carried out sustematic chapati tests with the improved Punjab and other provincial wheat varieties in the laboratory.

As the laboratory had become the defacto property of West Punjab Government since the date of partition of the Punjab, steps were taken to install its counterpart in India, so that milling and baking tests on Indian wheats could be received and also reserches of various disciplines could be carried out on the methods adopted in the pre-partition time. After partition the utility and inevitability of this plant become acute. Paucity of food grains and increasing population were immediate razor-sharp problems faced by the country. So under the second five year plan, a Cereal Research Laboratory equipped on the most modern lines with milling, baking and cereal testing equipment was set up at the Indian Agricultural Research Institute. New Delhi. In this project the Indo-US Technical Cooperation Mission and Rockefeller Foundation gave considerable assistance.

Rotary Screen

In fact Ram Dhan Singh, the noted Cerealist was a man of innovative nature. For a progressive farming his research oriented mind was always trying to invent new methods and machineries which could be useful for the production of high yielding crops and good seeds, for the farmers as well as to the agricultural researchers. So in 1934, Ram Dhan Singh had developed a rotary screen for the complete elimination of contaminated weed seeds from harvested produce. This equipment was quickly adopted by farmers and was popularized by the Department of Agriculture in the united Punjab. It became a routine venture on the farms of the Department of Agriculture and among progressive farmers to control weeds in the pre-partition Punjab. Ram Dhan Singh always laid the emphasis on the quality of seed to be supplied to the farmers. This was also a marvelous accompalishment which infused new zeal into the traditional mode of farming. The increase in the produce meant the sound foundation of the economy of the farmer, peasantry and the country as a whole.

The establishment of milling and baking laboratory and Rotary Screen by him indicates his immense interest in discovering the nature of the development of

agriculture for the progress of the country. Of course, this step shows his sound thinking, ripe experience, mature judgement and eagerness to foster development. Indeed, it is the manifestation of his vision and creativity. He also earned popularity in the state because of his sterling contributions.

We fondly relate an incident of great profundity with regard to the research leanings of Ram Dhan Singh, as narrated by Dr. P.S. Lamba [33] ex-Vice-Chancellor : "Once there was held a world wheat conference in Canada. At this meeting it was decided that articles, with fixed length, about wheat production may be called from agricultural scholars of various countries and the articles should be sent through proper channel up to a stipulated date. In this context Ram Dhan Singh prepared a research oriented article at his earliest. The time was short, so as per order of Mr. H.R. Stewart one copy of it was sent in advance to Canada and the other was set in motion for proper channel. Mr. H.R. Stewart was the Director of Agriculture of Punjab at that time. He was a man of great responsibility. In the meanwhile he wrote a letter to the authority concerned in Canada that we have sent an advance copy of the article to you, because of lack of time and the other is being sent to you through proper channel. Time was short and the article is lengthy, so it may be reduced if required, on the receipt of your reply. It is really very strarling that before receiving the reply of this letter Stewart received the letter from Canada mentioning therein that they have received the article and there is no need in reducing it further. The fact proves without doubt that Ram Dhan Singh always took deep pains in every work. Adequacy and accuracy were in his veins.

Dr. P.S. Lamba (b 1921), a favourite alumnus of Ch. Sahib, confessed that the great scientist was very strict in marking and was a very hard task-master, though he was a man of simple habit and good nature. His was bold hand-writing. Once he was offered a higher post of Punjab Agricultural Services cadre, Ram Dhan Singh outrightly declined the offer saying that he was fully satisfied with his work. In fact he was not after money and other facilities. He was meant for research. Indeed he was a true scholar who never hankered after high positions.

Dr. Lamba narrated one more incident about the post of principalship of the college. Ch. Chhotu Ram, a stormy petrel of Punjab politics died in 1945. Rao Bahadur Ram Dhan Singh had enjoyed the confidence of Ch. Chhotu Ram. After the death of Ch. Chhotu Ram some murmuring spread in the college that now Rao Bahadur Ram Dhan Singh would not be promoted as principal of the college. Rao Bahadur was a man of different mettle. He was always absorbed in his work. At last on the pressure of some people, he met Khizar Hayat Khan Tiwana, the then premier of Punjab in this connection. Tiwana told Rao that his fears were unfounded because injustice could not be done to such a person who had put in

such a valuable service to the state. In due course of time, Rao Bahadur Ram Dhan Singh obtained his due as per rules.

Rice

Undoubtedly, Rao Bahadur Ram Dhan Singh was a renowned wheat breeder who made outstanding researches into new wheat varieties. He was known as a wheat breeder whose fame crossed the boundaries of the nation. But his area of research was much wider. He kept himself devotedly involved in the development of a number of rice, barley and pulses varieties also. He thus rose to the higher pedestal of a cerealist.

Rao Bahadur Ram Dhan Singh did a commendable research work in rice also. In this field, too, he was a pioneer. A man of phenomenal industry and resolute mind he was always at work. He had a prodigious memory. It was under his guidance and supervision that several new improvd varieties of rice, barley, mung and mash pulses were evolved. He himself developed eight new rice varieties; five of which viz. Basmati 370, Jhona, 349, Mushkan 7 and 41, Palman Suffaid 246, were meant for plain areas, and three viz. Ram jawain 100, Phul pattan 72 and Lal Nakanda 41, were for hilly areas. Of these, Basmati 370 deserves special mention on account of its superfine quality and fragrance. Purple leaved rices, now common in Kangra district capable of fighting the wild rice problem, were the results of his cross-breeding efforts. These varieties are considered best among the world famours varieties.

Work on rice was conducted at a premier Rice Farm, Kala Shah Kaku, whose area was increased to about 625 acres by the addition to it in December, 1937, of about 234 acres. The Farm used to produce about 10,000 maunds seed of improved varieties for distribution to growers in the province. Abreeding sub-station with an area of about 8 acres was also started in May, 1936 in Kangra district for the improvement of the Punjab hilly areas.

By developing Basmati variety during his time, he had made the erst-while Punjab of India and Pakistan the owner of Basmati germplasm as per Article 22, Section 3 of the GATT-TR IPS. India alone exports Basmati worth something like Rs. 1500 crore a year.

The development of rice varieties was indeed a cherished step. It enriched the Indian agricultural economy and national life. He, thus, opened the new vistas for the succeeding researchers in this cereal also.

Though Punjab Proince was not a traditionally rice growing area, yet, rice was grown under irrigated conditions both in plain and hilly regions of the state.

As in case of wheat, the effect of partition on the rice crop of the Punjab (India) had also been very adverse. This newly carved state got only 37.2% of the total area and 27.4 percent of the total production of rice in the undivided Punjab. Still the area under rice in this State, was slightly higher than 4 lakh acres and since this cereal formed the most common staple food of people in certain areas, especially the hilly tracts, its importance in the agricultural economy of this state cannot be over-emphasised. Of the total area covered by this cereal about 1.2 lakh acres fell in the hilly districts of the Kangra and Shmila and the remaining 2.8 lakh acreas occured in the plains.

The earlier research work on this cereal was directed towards isolation of pure-breeding high-yielding strain from the mixed sort of some important agro-commercial groups of paddy grown in both plains and hills of the state. The varietal improvement of Basmati rice was initiated during the 1920's at Kala Shah Kaku in theerstwhile Punjab (now in Pakistan) and Nagina in Uttar Pradesh. The famous varieties developed by Ram Dhan Singh of the cereal are given below .

Varieties of the Plains

1. Basmati-370

This was a very fine variety of pulao rice with long, slender grains, which on cooking gave fragrant aroma and elongate considerably without running into mass. It did best on rice lands with plaintiful supply of irrigation water. It was released in 1933 and gave consistently good results. So demand for seed was particularly keen. In cooking quality tests Basmati-370 continued to be at the top. Its transplanting-flowering duration remained almost constant, except in cases of very late plainting. Basmati-370 plantings in the first week of July gave considerably and significantly higher yields than either very early or late plantifing. The quality of grain from very early plantings of 370 Basmati was found to be definitely poorer.

2 & 3. Muskhan – 41 and Muskhan – 7

As their names indicate, both these varieties also belonged to the scented group of rice and can be used for making high class pulao. In fact, people of taste like them better than even Basmati. The difference between Muskhan-41 and muskhan-7 is that the latter is amenable to somewhat easy threshing than the former. These varieties can do well even on soils of average fertility. These were

released in 1933 and gave consistently good results. 7 Muskhan's duration if shortened is planted early, i.e. before the middle of the rice planting season.

4. Palman Suffaid –246

This was the best selection of Palman group of rice, in which the outward appearance of grains was as good as of the Basmati varieties. In cooking quality, however, it is much inferior to Basmati rice, as its grains possessed the tendency of bursting their jackets when boiled in water. In spite of being fine it is not a late ripener like Basmati and Mushkan varieties and takes only 90-95 days to reach maturity after transplanting. It is the best yielder in the Palman group. It was being marketed in considerable lots under the trade name of "Chitti Palman". It was released in 1932. It had outyielded 46 Palman and also fetched better prices than common red-husked Palmans. Its transplanting-flowering duration remains almost constant except in cases of very late planting.

5. Jhona-349

This also is a coarse and approved variety, medium in maturity and a very heavy yielder, giving over 35 maunds of paddy per acre on soils of medium fertility. It yielded an average of 47.5 maunds per acre on five acres under direct cultivation. It gave a maximum yield equivalent to 60.7 maunds per acre froma small experimental plot. This is the highest yield of paddy ever obtained on the Farm. Fine varieties of rice such as Mushkan and Palman did not fare so well. This variety was released in 1933 and gave consistently good results. So demand for seed was particularly great. Its transplanting flowering duration remains almost constant, except in cases of very late planting.

Varieties for the Hills

1. Ram Jawain-100

It is a medium quality rice and does best where rainfall is supplemented by artificial irrigation in the Kangra Valley.

2. Phool Pattas-72

It is also a medium quality rice and its requirements are the same as those of 100 Ram Jawain, but it is a slightly better yielder.

3. Lal Nakanda-41

Being rather a coarse variety, it was suited for the drought like conditions prevailing in the Dera Gopipur, Hamipur and Nurpur tahsils of the Kangra district.

According to 1931-35 quinquennium progress of five improved, approved varieties, Jhona-349, Basmati-370, mushkan-7, Mushkan-41 and Sathra-278, the first four were released in 1933 and the fifth in 1934, were giving consistently good results. Demand for seed of Jhona-349 and Basmati-370 was particularly sharp. Seed of these given out to growers from the Farm was (in maunds) as follows :-

Variety	**Year of Release**	**1935**	**1936**	**1937**	**Total**
Jhona-349	1933	1141	1135	1116	3392
Basmati-370	1933	1420	1400	1316	4136
Mushkan-7	1933	225	125	87	437
Mushkan-41	1933	500	435	140	1075
Sathra-278	1934	476	970	835	2281
	Total	**3762**	**4065**	**3494**	**11321**

Pure seed of the above mentioned improved varieties, particularly those meant for growing in the plains, was being multiplied in the pre-partition days at Kala Shah Kaku (Sheikhupura district) where a farm of about 600 acres had been established by the Agricultural Department for the purpose. From this farm about 5000 to 6000 maunds pure seed used to be distributed to farmers every year, but as in the case of wheat a major position of this seed went to the farmers in the West Punjab and very little seed was allocated to the thirteen districts now constituting Punjab (India). The result of this was that, while improved varieties spread on fairly vast areas in districts like Sheikhupura, Gujranwala and Multan, their spread in west of the districts of the Punjab (India) had been very limited indeed. As Kala Shah Kaku farm went to the West Punjab Government, it was evident that new Farms for multiplying seed of improved rice varieties was to be set up in over new state, so that these varieties could be spread on the desired scale. After the partition one such farm was established at Nurpur, Kangra district for multiplying the seed of hill rice varieties and there is urgent need of eatablishing a farm in the plains (preferably in Gurdaspur district) for multiplying improved varieties of plain rice.

Further work on this crop was carried out with two objectives. The first of these concerns itself with the selection of improved varieties from these agro-commercial groups, both of plains and hills, whicfh was tackled hither to.

The second problem was in connection with the control of wild rice, which was the most serious menance to rice cultivation in the Kangra valley.

Barley

As mentioned earlier, Ram Dhan Singh was not exclusively interested in wheat alone. He extended the scope of his research to barley as well. The development of T-4, T-5, C-138, C-141 and C-155, varieties of barley stood to his credit.

While in case of wheat and rice Punjab (India) lost heavily both in respect of area and production as a result of partition, but in case of barley crop, it was a definite grainer, as it got 65.9 percent (0.54 million acres out of the total 0.83 million acres) of the area and 5.8 per cent (1.3 lakh tons out of the total of 2.38 lakh tonnes) of the production of this cereal in the united Punjab. The special importance of barley in the state was in the fact that it possessed superfine quality for malting and brewing purposes in this respect it was the best in the whole of India.

The district of Gurgaon in particular was famous for the good quality of its barley. Early attempts at improving this crop were concerned mainly with the selection from local mixtures of pure breeding varieties giving high yield, and possessing plump and heavy grains. As a result of this earlier work, two varieties, namely T-4 and T-5 were isolated and released to growers up to 1930. Of these, T-4 was an early maturing bold seeded, six-rowed husked type best suited for lighter soils particularly of Gurgaon, Hisar and Ferozepur districts. Yields of 30-35 maunds of grain per acre was quite commonly obtained from this variety when grown under favourable conditions.

Due to its extreme earliness, this variety was also very suitable for late sowings, In contrast to T-4, T-5 was a type medium in maturity having dense ears and very stiff straw. On account of its non-lodging character, this variety was particularly suited for cultivation on rich irrigated lands, on which lands yields as high as 40 maunds per acre. The malting and brewing qualities of both T-4 and T-5 were very good and in this respect they were found by the Institute of Brewing, London, to be much superior to the common run of Indian barleys. Pure seed of these varieties was being multiplied at the Agricultural Farm, Gurgaon and Foundation Seed Farm Nagla (Karnal) for distribution in the state.

Malting and Brewing tests on Punjab Barleys

"T-4 and T-5, described in the 1931-35 quinquennial report, were approved, and improved types. In 1930, small samples of 43 barley types isolated at Lyallpur in the course of cereal-breeding work, were sent for valuation to the Institute of Brewing, London. From among these the Institute singled out 13 types as being of good quality. Of these 13, T-4 gave the highest amount of extract and

about it the Institute remarked that "It is as good as Californian and has 5 shillings a quarter higher value on account of its extract. It would always find a market at price above the average, well worth growing on commercial scale."

Punjab was the third largest barley producing province of India and so it was included in the scheme of the Imperial Council of Agricultural Research on the investigations of the malting and brewing qualities of Indian barley.

In the year 1934, six types of Punjab barley were sent to the Institute of Brewing, London, from Lyallpur, viz. T-4, T-5, 'Lyallpur B-5,' 'Mianwali', 'Multan' and 7.035. In these tests, Type 4 again occupied the premier position and type 5 also did fairly well. In 1935 and 1936 also the samples of T-4 and T-5 were sent.

In 1937, ten samples (6 of type 4 and 4 of type 5) from four places in the province (Gurgaon, Ferozepore, Rawalpindi and Lyallpur) were sent to London. Both had poorer appearance in comparison with Californian which held the field, but the malts gave better analytical figures than Californian. The Institute of Brewing further remarked about them that they would not sell on apperance, but the actual value of the malt on the basis of extract, being considerably greater than that of Californian. The Institute of Brewing further remarked about them that would be an inducement to brewers to buy the malts made from them. In 1937, in addition to above, bulk samples of 300 maunds each of types 4 and 5 grown respectively at Gurgaon and Leiah (Muzaffargarh district), were also sent, for large scale commercial tests. These were found quite satisfactory for malting and brewing, but certainly lacked in appearance.

The present research work in barley was being pursued with three objectives. In first of these objectives, it was envisaged to evolve new varieties of barley, which besides having highly yielded and plump kernels, possessed a bright colour of grains which was an important factor in determining the price of the produce. It may be noted in this connection that the existing improved varieties (T-4 and T-5), although possessing other desirable traits, suffered from the defect of dingy grain colour, with the result that they could command that high price in foreign and local markets. Both these types of barley were satisfactory for malting and brewing in England, but their physical appearance was not such as to command them to purchase who were unaccustomed to use them. For achieving success in this objective a broad-based programme of hybridization between foreign bright-grained and indigenous types was to made seriously. The second objective aimed at infusing the element of disease resistance in the improved varieties. The most serious diseases were yellow rust and the loose and covered smuts.

The third objective aimed at the evolution of high yielding types of two rowed barleys, which as a class, were characterized by very uniform, plump, roundish and shapely grains, and as such were most suitable for preparation of high class 'pearl' products. Judging from the studies so far made in this connection, it appeared that some re-selections made from C-155 (a bright-grained two rowed barley evolved by hybridization some years ago but found to be impure lately) could amply fulfil the need in this respect. It may be mentioned that the demand for 2 rowed barleys for the preparation of pearl and power products had considerably increased in the country since World War II owing to shrinkage of imports of these products from abroad. The dissemination of improved seed of these 2-rowed barley was, therefore, an urgent necessity.

As a serious and targeted agricultural scientist, Rao Bahadur Ram Dhan Singh was very much alive to the needs of people and peasantry of different areas. He was very much aware of their requirements. So he developed varieties according to their suitability of soil and benefits. These varieties were suited to unirrigated or limited irrigation conditions and salt affected areas. These varieties helped lower income group peasantry because barley was still consumed primarily as a food by lower income consumers. Barley has the cooling property and thus was suited for its consumption during North Indian summers. Ram Dhan Singh submitted a scheme in 1933 for processing of barley into malt. Thus he tried to develop those varieties of cereals which could suit the requirements of agro-industries for processing so as to generate more employment and income opportunities for the peasantry. He was indeed a great humanitarian.

Pulses

Rao Bahadur Ram Dham Singh further enlarged his research activities in the filed of pulses also. He very well knew that pulses were important part of food and were remarkably indispensable diet of human beings. This agriculture icon showed deep interest and put a great labour in the development of pulse varieties also. Some bold-seeded China Mung varieties, Mung Nos. 54 and 305 and Mash No. 48, were the products of his sustained work.

The three important pulses of the state were moong, mash and massar, which occupied the areas of about 88,000, 1,43,000 and 76,000 acres respectively. Of these pulses, moong essentially a crop of drier parts and lighter soils occupied largest area in the districts of Hisar, Ferozepur and Gurgaon, mash and massar pulses predominated in these districts which had heavy rainfall such as Gurdaspur, Ambala and Kangra, and they did best on stiffer type of soil.

As a result of the selection work done in the moong pulse, since the year 1937, one improved variety, namely Mung No. 305, was evolved in the pre-partition period and placed on the departmental list of approved crop varieties. However, with a view to exploring still better varieties than Mung No. 305, breeding work on this pulse continued partition.

In the mash pulse, selection Mash No. 48 was found to be a very high yielder, besides possessing extraordinarily good cooling qualities. This variety received official recognition in 1948 as a suitable sort for cultivation in plains.

Although pulses and barley are popular in the form of 'Dal' and 'chapaties' respectively yet they are becoming equally popular as ready-to-eat paste called 'Sattu' not only in India but also in other international agencies with the globalisation of Indian economy.

Thus we see that Rao Bahadur Ram Dhan Singh brought a revolution in agricultural research by developing a number of high yielding and good quality varieties of cereals and pulses viz. wheat, rice, barley and pulses. It was an outcome of his dedicated labour and his sincere singular devotion to his profession and duty that he could release so many improved and prominent varieties. Undoubtedly, it was his outstanding achievement of historical importance. But he never flaunted his remarkable talents. He was a research scholar of the high order. In a way he changed the entire face of crop-breeding and crop-husbandry. It is a matter of great pride and honour that some of his varieties performed well in Canada, Mexico and in other countries, became world famous varieties and got international recognition. In the wake of his extensive research and for his professional excellence he was recognized both in India and abroad and attained legendary fame.

Rao Bahadur Ram Dhan Singh, a torch-bearer of agricultural researches, was a practical plant breeder who spent most of his time in the field watching crop plants rather than sitting in the office chair. Thus he gave extraordinary preference to field work. He used to work alongwith Dr. L.S. Negi and S. Kartar Singh Labana in wheat fields for long hours during the months of May and June when temperature used to rise above 40 C at the Lyallpur Agricultural Farm. He was a serious researcher who spurned the temptation of keeping himself in the ivory towers.

Though the number of his students is unlimited, we may note a few notable students and scholars whom Rao Bahadur Ram Dhan Singh trained as a agricultural scientists – Dr. S.M. Sikka, Dr. L.S. Negi, Gurbakash Singh Sekhon, Dr. K.S. Gill, Dr. Gurcharan Singh, G.S. Bains, Dr. D.R. Bhumla, Dr. Dhani Ram Vasudeva, Sh. Dharampal Singh Rathee of village Manana (Panipat District),

Chief Conservator of Forests, Punjab (Retd), Ch. Rattan Singh of village Bighan, Chief Conservator, Haryana (now dead), Dr. P.S. Lamba, ex Vice-Chancellor, HAU, Hisar, Ch. Ram Singh, I.G. Police, of village Sanghi (now dead) and Dr. Amrik Singh Cheema, Ex Vice-Chancellor, PAU, Ludhiana and Adviser to theWorld Bank.

Dr. L.S. Negi was the first post-graduate student of Rao Bahadur Ram Dhan Singh to work on "Census of an acre of wheat". He later became the second Vice-Chancellor (1968-72) of Jawahar Lal Nehru Krishi Vishva Vidyala, Jabalpur (M.P.) which was established in October, 1964.

He was, indeed, a fountainhead of knowledge for his colleagues and students. The pattern of dedicated work dominated his whole life till death. A large number of his students rose to the top-high positions in their career. To him the students were the cultural and academic messengers and thus were his first priority. His loving and meticulous care for them never diminished. He bore no illwill to anyone. Consequently, all of them remember this noble scientist from the core of their hearts.

Proudly, this galaxy of scientists, who got education and inspiration from Rao Bahadur Ram Dhan Singh, made great contributions to wheat husbandry and economy of India and the country embarked upon the path of self –sufficienty in food production. Thus Rao Bahadur Ram Dhan Singh, alongwith this crop of scientists, placed the country on the strong foundation of food economy. Indeed he was one of the epoch-making scientists of India.

That is why, out of emotions, though just contradictory to service rules, Mr. Herbert Ray Stewart, the then Director of Agriculture remarked at that time of retirement, when he presented his papers of pension, that "Dr. Ram Dhan Singh should be given as much pension as possible. He had done a meritorious service to the peasantryof Punjab that any amount of pension given to him will not be able to compensate him. There cannot be a more rewarding appreciation and homage to the achievements made by Ram Dhan Singh in his lifetime.

This celebrated plant-breeder and illustrious son of Haryana rose to the pinnacle of the ladder of his profession and initiated an era of agricultural development in general in the united as well as in divided India. He was a promoter of agricultural research par excellence. Thus he established the agricultural aristocracy and enriched the national life of the country. That is why he still occupies a revered position in the hearts and minds of plant-breeders and farmers of our country. So by dint of his creativity he carved a permanent niche for him in the firmament of agricultural history of India. As a teacher and as a research scholar, he was a class by himself.

Dr. Ram Dhan Singh served Agricultural College Lyallpur for more than two decades, first as a Cerealist (1926-1946) and then as its Principal (1946-1947). During this period a number of students, college employees, officials of the Agriculture Department and other public men came under the spell of this extraordinary person for his striking qualities of simplicity, sincerity and deep commitment towards his profession, collage and the students. Some of the scholars who responded to the request of the present writer to share their impressions of this mighty soul in the garb of a teacher, have almost reconstructed an age when merit of the teacher commanded the undiluted love from the taught, both in and out of the class.

Rao Bahadur Ram Dhan Singh was, at heart, a very simple person who loved life with all its natural gifts. He was not crazy about artificial facilities. Shri Amir Singh. Former Professor and Head of the Division of Seed Science and Technology I.A.R.I. New Delhi and Senior Advisior (Retd) Food and Agricultural organisation of the United Nations, once a student of Rao Bahadur at the post graduate level in this college, speaks of utter lack of modern amenities at his residence: "During the college years, I visited Chaudhary Sahib's house and office on several occasions. He lived a very simple life which was reflected from the household goods in his drawing room, living room and kitchen, no revolving chair, no air-conditional and other decorations, His working table was surrounded by baskets full of varieties of wheat grains used by him. His office and laboratory were in the same room."

Rao Ram Dhan Singh was a saintly being wearing turban called "safa", which belied his intellectual accomplishments. He was a sadhu who kept little for himself. He shared his knowledge and resources with the fellow-travellers and stimulated love for work at Sonipat, he was in correspondence with Hon'ble Dr. Rajender Prasad (1884-1963), first President of India who in his letters greatly appreciated Rao Bahadur for the work done by him.

Rao Bahadur Ram Dham Singh had imbibed love for agriculture from his surroundings as a members of farming community. The blood of the tillers of land flowed in his veins. His schooling and close contacts with scholars in the domain of agriculture further lent credibility to it. Meeting a scientist devoted to research in agriculture gave him immense joy. He warmly appreciated the work done by the youngsters in the field and kept in touch with them. Surprisingly, he never forgot them, though personally he might not have met them. Such nature establishes his true love to the field of agriculture. In this regard Dr. Khem Singh Gill, Former Vice-Chancellor, P.A.U. Ludhiana narrate an incident which shows the living interest of the man, he revealed "I got an opportunity to meet him for the first time at an International Agricultural Fair, New Delhi in mid-fifties, while

I was looking at some of the exhibits on crops. I found that an old person with long coat and turban was very curiously looking at the exhibits. I had not met him personally earlier, but seen his photographs, I felt that he might be Rao Bahadur Chaudhary Ram Dhan Singh. Gleefully, I approached him and after paying my respects, I introduced myself and enquired whether he was the same personality. He looked at me over his glasses, patted me and said "Oh; yes, Dr. Laxman Singh Negi had told me about you and your work." I always remember this incident and the love which Rao Sahib showered on me at that time and thereafter. Dr. L.S. Negi worked with Rao Sahib at Lyallpur as Research Assistant and then as Assistant Breeder (Maize). Rao Sahib had great appreciation and love for Dr. Negi. Dr. Negi also served as Vice-Chancellor of the Assam Agricultural University at Jorhat. I worked with Dr. Negi as an M.Sc. student and then as a Plant Breeder. Ever since my meeting with Rao Sahib at Delhi, I remained in touch with him."

Because of his wheat crop researched Rao Bahadur Ram Dhan Singh had attained a great reputaion far and wide. He commanded respect from all quarters of India and abroad. Pakistan which had been a part of India before 1947, also a bowl of wheat grains because of the development of varieties in ceretals by like Rao Bahadur Ram Dhan Singh acknowledged his services. Recognising his contribution made to the development of agriculture in the region, the Government of Pakistan invited him in 1961 on the occasion of the golden jubilee of the College of Agriculture, Lyallpur where Dr. Singh had been serving as a cerealist and as a principal with utmost sincerity and care. At this gala reception, he was presented 'Gold medal' by the President of Pakistan.

The gold medal is still in possession of his family. The face of the medal contains the words 'Golden Jubilee (1909-1959) The Punjab Agricultural College Lyallpur' and on the back is written "Awarded to Ch. Ram Singh". On this occasion Dr. Ram Dhan Singh unfurled the college flag. Mohammad Ayub Khan (1907-1974) who was the President of Pakistan from 1958 to 1969, himself received Chaudhri Sahib, an Indian citizen, at the national border. The recognition given to him for his work by Pakistan Government was undoubtedly a significant event. During the function, Muhammad Ayub Khan uttered some really significant words to Rao Bahadur Ch. Ram Dhan Singh. Chaudhary Sahib stay with us in Pakistan and you would see how we pay respect to you. Generally in our land (India and Pakistan) military men and scientists are not given their due honour.

While living in the isolated town of sonipat, he retained living links with august institution named IARI which was, and is an active forum of interaction between agricultural scientists: Scientists associated with the wheat improvement

programme during that period had great respect and admiration for Ch. Ram Dhan Singh for the excellent wheat varieties evolved by him and derived inspiration from him in their wheat research work. Dr. Singh was a member of the Committee 'Variability in Indian Wheats. The young scientists were greatly benefited because of the rich exchange with Rao Bahadur. In this way Dr. Singh rendered a great service for the nation till death.

Ch. Ram Dhan Singh And Dr. Norman E.Borlaug

It stands to reason that one intellectual meets another intellectual through his creativity first. Because of the popularity and recorded productivity of wheat varieties C-518 and C-591, evolved by Ram Dhan Singh, his name and fame had gone to Mexico also, where Dr. Norman Earnest Borlaug made his future at the CIMMYT institute. Accordingly, a little information about this institute which became a great instrument in ushering in an era of green revolution in the world as well as in India becomes inevitable.

CIMMYT

CIMMYT stands in Mexican language for Centro Internacional de Mejormiento de Maize Y Trigo. It is an International Centre for Maize and Wheat Improvement.

In 1942, agriculture in Mexico was in a deplorable condition. Wheat yield was low and static, even on the irrigated land. So in 1943, a pionner cooperative agricultural research and training programme, at the request of Mexican Government, was launched jointly by Mexican Ministry of Agriculture and the Rockefeller Foundation (N.York), to provide help in increasing the production of maize and beans in Mexico.

In 1944, Rockefeller Foundation selected Dr. Norman E.Borlaug, a young scientist, who was born at Croso, lowa on March 25, 1914, for this programme. He had obtained Ph. D. in plant pathology in 1942 under the world famous plant pathologist Dr. Elvin Charles Stakman. Dr. Borlaug lateron became the Director of Wheat Department of International Maize and Wheat Improvement Centre (CIMMYT), Mexico also. Amiable, industrious and field-oriented and gifted with an inspiring personality, Dr. Borlaug provided an excellent leadership to the CIMMT staff.

Rockefeller Foundation

Rockefeller is the name of a U.S. family founded by John Davison Rockefeller (1839-1937, an industrialist of first American oil enterprise and a great philanthropist. His only son John Davision Rackefeller, Jr (1874-1960), was

associated with his father in the creation and development of the Rockefeller Institute for Medical Research (1901), the General Education Board (1902), the Rockefeller Foundation (1913), Laura Spelman Rockefeller Memorial and International Education Board (1923), etc. He devoted his whole life with gusto and deep philanthropic leanings to continue the family traditions.

The Rockefeller Foundation was created in 1913 to promote the well-being of mankind throughout the world. The foundation was recorganized in 1928. It broadened its scope and thereafter liberally financed pure research. It created division of public health, medical sciences, natural, social sciences, special research projects and independent research agencies.

The United States is, indeed, a land of foundations. Although charitable endowments existed in antiquity, yet the modern foundation is predominently a 20th century American phenomenon. Charitable trusts of foundations with limited local purposes have been overshadowed by these large foundations, possessing broad purposes and flexibility of action. Because of thriving business fortunes, the organised philanthropy developed in America, especiaally after 1900 and after 1914 a substantial growth of community foundations was witnessed. Surprisingly, after 1940 a wave of personal, family and company sponsored foundations appeared in the United States.

Research Work at CIMMYT, Mexico

Japan contributed the dwarfing 'Norin 10' genes to this institute, United States provided the scientists and Mexico offered the land and the labour. The wheat breeders at the CIMMYT collected samples of Mexican varieties and the imported seeds from major wheat producing countries of the world. Research work started vigorously and the first improved varieties for distribution became available by the autumn of 1948.

Borlaug producedd high-yielding wheat variety by adopting some new concepts in plant breeding. He was able to do so by incorporating dwarfing genes into these varieties. The short-strawed germplasm 'gaines' developed from Norin 10 crosses by Dr. D.A. Vogal of the Washington State University was also obtained by Borlaug in 1953. By 1955, 75 percent of the Mexican wheat crop was derived from them like Sonora 63, Sonara 64, Lermo-Rajo 64, Toluca 18, etc. This 'Norin 10' was crossed with rust resistant Mexican wheat and Columbian wheat and dwarf lines were released in 1961. Borlaug is the first wheat breeder to have succeeded in the use of dwarf parents in the evolution of commercial wheat verieties. The varieties which he produced were insensitive to day length, contained unprecidented adaptability, stability in diseases resistance and was fit to be grown over a wider area in the world. These are remarkably resistant to

common wheat diseases. Wheat breeding work was initiated at Hisar campus mainly to develop suitable wheat varieties for low fertility areas.

In March 1971, Rao Bahadur Ram Dhan Singh spent lot of time in wheat research area at the fields of H.A.U. Hisar alongwith Nobel Laureate Dr. N.E. Borlaug. On enquiring about the reasons of the great success of wheat varieties developed by him, he pointed out that repeated testing of genotypes at multi-locations gave him the desired results in terms of yield and stablity.Dr. Borlaug supported the idea and said that at CIMMYT he also followed similar approach of testing genotypes. Further Dr. Borlaug asked Ch. Ram Dhan Singh whether he ever noticed dwarf plants in his breeding material. Ch. Ram Dhan Singh replied in the affirmative and said that he had observed dwarf plants in some especially interspecific crosses but no one cared for such genotypes at that time because of acute shortage of irrigation water and limited use of fertilizers for wheat cultivation in India. Rao Bahadur used to guide to the wheat breeders of this university.

Rao Bahadur Dr. Ram Dhan Singh was an exceptionally devoted person to the development of agriculture in India. Even in the evening of his life he was busy in the activities which were related to this area. The Eleventh All India Wheat Workshop was held at H.A.U. Hisar from 22 to 28 August 1972. The workshop was formally inaugurated by Sh. A.L. Fletcher, Vice-Chancellor on 24th August 1972. The top ranking agricultural scientists from all over the country participated in this workshop. To name only a few were Dr. Ram Dhan Singh, Dr. S.M. Swaminathan, D.G. (ICAR), Dr. A.B. Joshi, D.G. (IARI), Dr. T.R. Mehta, Dy. D.G. (Crops) ICAR, and Dr. J.S. Kanwar, Dy. D.G. (Agronomy & Soils) ICAR. Infact his keenness for the development of agriculture never diminished.

In commemoration of his invaluable contribution to science and society, the H.A.U . Hisar, named residential complex (Women Teachers and Post-Graduate Home) as “Rao Bahadur Ram Dhan Singh House.” The foundation stone of the complex was laid by Smt. Indira Chakravary, wife of Sh. B.N. Chakravarty, the then governor of Haryana on April 27, 1971 and on completion it was inaugurated by the lady Governor on February 28, 1973.

The 4th Convention of the Association of all India Agricultural Universities was held on 7th April 1973 at H.A.U. Hisar. On this very day the Third Annual Convocation of H.A.U. also held with great fanfare in the Hall of Giri Centre. At this time the university honoured three eminent scientists of India i.e. Dr. Ram Dhan Singh, Dr. B.P. Pal and Dr. M.S. Swaminathan. The chief guest, on the occasion, was Sh. Fakhruddin Ali Ahmed (1905-1977), Union Minister for Food and Agriculture.

Presenting Ch. Ram Dhan Singh to the Chancellor (Sh. B.N. Chakravarty) of the university the founder Vice-Chancellor H.A.U. Sh. A.L. Fletcher, a person of extraordinary ability and capability, described him not only a great scientist but also a great teacher with an abiding interest in the welfare of education of youth. He added that the life of the 82 years old patriarch had been a saga of dedication and devotion to the cause of agricultural sciences and research. He further averred that Dr. Ram Dhan Singh revolutionized wheat husbandry in the country by evolving wheat varieties C-518, C-591 which were released for cultivation not only in Punjab, Sindh, United Provinces and other parts of pre-independent India but had also founded their way to Canada and Mexico. C-591 evolved in the thirties, still occupies the largest area under any single variety. Dr. Ram Dhan Singh also developed other cross-breed wheats and had done outstanding work in rice, barley and pulses.

Citation Read by Vice Chancellor for the Conferment of honorary degree to Ch. Ram Dhan Singh.

Mr. Chancellor :

I have the honour to present Dr. Ram Dhan Singh for conferment of the Degree of Doctor of Science (Honoris causa) in recognition of his invaluable services to the cause of agricultural production, research and education.

Dr. Ram Dhan Singh was born on the 1st of May, 1891, in a peasant family of village Kiloi in Rohtak district. After completing his High School education at Rohtak, he passed Intermediate examination from the D.A.V. College Lahore. In 1909, he joined the Punjab Agricultural College, Lyallpur, with the first batch of students admitted to the Diploma Class, and obtained the Diploma of Licentiate in Agriculture in 1912. From 1914 to 1919, he worked at the Agricultural Research Institute, Pusa, Bihar, with Sir Albert and Lady Howard, who were pioneers of plant breeding in this country. Simultaneously, he worked for his B.Sc. degree, which he got from the Patna university in 1919. Thereafter, he proceeded to Cambridge university, England for M.A. In Natural Sciences (Tripos) and Diploma in Agriculture. He joined Punjab government service in 1925 as Fodder Specialist, and nine months later, became Cereal Specialist. From 1926 to 1947, when he retired as principal of the Government Agricultural College, Lyallpur, he had dedicated himself to research and teaching. In recognition of his services to the cause of teaching and research, the British government honoured him with the title of Rao Bahadur.

To Dr. Ram Dhan Singh goes the credit of having revolutionsed wheat husbandry in the country by the evolution of wheat varieties C-518 and C-591, which were released for general cultivation in the thirties. These wheats were cultivated not only in the North-West Frontier Province, Punjab, Sind, United Provinces, Bihar, Central Provinces, Central Indian States, Rajasthan and Gujarat of pre-independent India but had also found their way to Canada and Mexico. C-591, on account of the pearly and rounded appearance of its grains and its excellent chapatti-making quality, fetched a premium of Rs. 4 per maund even at that time. Sir Percy-Marsh, who was Chairman of the Joint Public Service Commission of Punjab and the N.W.F.P., said in one of his public speeches "I feel sure that Stalin would have the greatest respect for Rao Bahadur Ram Dhan Singh who has done such good work for wheat production in these provinces, but I wonder if the Rao Bahadur would escape trial if his varieties C-518 and C-591 ever failed in a abnormal season." As a mater of fact, these varieties have never failed and even in these days of competition with Mexican and indigenous dwarf varieties Dr. Ram Dhan Singh's wheats hold the field for quality and price. Shri C. Subramaniam, the then Union Minister for Agriculture testified to this when he said in 1965, C-591, evolved in the thirties, still occupies the largest area under any single variety.

Subsequently, he developed other cross-bred wheats, namely C-228, C-250, C-217 and C-253. Many new varieties, such as C-281, C-285, C-286 (not related -?) and C-273 and which were released after his retirement, were developed from the material that he had cross-bred while in service and which were under trials when he retired.

Dr. Ram DhanSingh has also done outstanding work in rice and pulses : Basmati-370, Jhona-349, Mushkan 6 and 41 and Palman Suffaid-246 for plain areas and Lal Nakanda-41, Ram Jawain-100 and Phool Pattas-72 for hilly areas, were developed under his leadership. Purple leaved rices, now common in Kangra district, to fight the wild rice problem, were the results of his cross-breeding efforts. Some China moong varieties, Moong Nos. 54 and 305, Mash No. 48 and Barley T-4, T-5, C-138, C-141 and C-155 were also the products of his research.

In 1934, he designed a rotary screen for the complete elimination of weed seeds from wheat seed.

Indian farmers owe a great debt to Dr. Ram Dhan Singh, and the revolution in wheat production brought about by him was in its time as significant as the more recent one achieved by the introduction of Mexican wheats.

Dr. Borlaug, Nobel Laureate, made a special call on Dr. Ram Dhan Singh at Sonipat in 1963, to pay him compliments. Later, in a letter to Dr. Ram Dhan Singh from Mexico, he wrote : "I recall honour of meeting you at I.A.R.I. in 1964 (1963-?). Prior to that I had known you only through the excellent wheat varieties which you had produced, originally for the Punjab, but which subsequently were grown extensively throughout the Indian sub-continent as well as in many other countries."

This great son of Haryana is a scientist to be honoured, emulated and held up before all young scientists as a source of inspiration for hard, dedicated and selfless service to science and the farmers of India. The Punjab Agricultural University conferred its highest degree, D.Sc. on him and has named an entire block of buildings after him. We have already named our beautiful New Junior Faculty House after him.

Dr. Ram Dhan Singh is not only a great scientist, but a great teacher with an abiding interest in the welfare and education of youth. He has been closely connected with many educational institutions. His present study is to trace the roots and words common to English and the languages of India, particularly Sanskrit. He is also rendering valuable service to this university as a member of its Board of Management.

Dr. Ram Dhan Singh is a national hero with a major contribution towards the attainment of national self-sufficiency in food and richly deserves the honour to be bestowed. In doing so, the university will add a memorable page to its annals.

Mr. Chancellor, it is now my privilege to pray that you may be pleased to confer upon this distinguished scientist and selfless worker the degree of Doctor of Science, Honoris Causa.

Hisar (A.L. Fletcher)

Vice-Chancellor

April 7, 1973, Haryana Agricultural University

The intensity of his love for agricultural development and the agricultural scientists was immeasurable. Age, illness and other hurdles could not block the flow of his love. It is clear from the following lines of Dr. Khem Singh Gill, a reputed Plant Breeder.

"While I was Head of the Department of Plant Breeding, a Summer Institute on "Methods of Plant Breeding" was organized in 1975. I invited Rao Sahib to deliver the key-note address to the participants. On accounts of health reasons, he could not do so. However, he wrote to me a letter in which he had briefly mentioned the contributions made by him in crop improvement and the methodology followed by him. He stated that he was the Lord of his projects and he had no other specialist such as Pathologist, Engomologist or Agronomist involved in making decisions or creating hurdles. He further stated that now it is very difficult for a Plant Breeder to do this work because he has to carry the additional heavy load of other specialists together.

In his opinion, a Plant breeder looks at a plant as a whole (multi-dimensional unit performing in a harmonious manner under particular environment) and not with the shaded lenses of other specialists who tend to concentrate on a few traits and thereby ignore majority of the parameters of performance. Rao Sahib had a broad vision and was a witty person. He was of course a hard task master like a diamond. You know a diamond is needed to cut (to give shape to), another diamond. Dr. L.S. Negi, Sardar Avtar Singh and Pandit Dhani Ram are examples of some of the diamonds he cut. Besides many scientists of other disciplines benefited by emulating him. He inspired a large number of scientists and students of his time. I also got inspiration from him."

Ch. Ram Dhan Singh used to visit H.A.U. Hisar campus several times and because of his great affection with wheat crop, he always tried tofind time to visit wheat breeding research programme. In fact he had great concern for the development of this university in general and crop improvement programme in particular. He had been a great source of inspiration for the faculty and the students. His visit to H.A.U. Hisar provided stimuli to scientists to accept the challenges and work hard to overcome food security and ensure welfare of the society.

A great visionary and a doyen of Indian agricultural research and education, Dr. Ram Dhan Singh was well known as the architect of the agricultural research and education especially in the field of genetics and plant-breeding during the pre-independence era. Dr. R.P.S. Tyagi, Former Vice-Chancellor of Himachal Pradesh pays tributes to Dr. Ram Dhan Singh " His work on disease resistant breeding programme in wheat and some other crops is internationally recognized and the improved varieties evolved by him became so popular with the farmers that he is still revered and remembered very fondly by the farmers as well as the scientists of the country.

Dr. Ram Dhan Singh who combined in his perspective a passion for the theoretical aspect of plant breeding with an extra-ordinary capacity for spotting "the winner" in the field, Dr. M.S. Swaminathan believes, was a giant among our agricultural scientists whose "life and work will continue to inspire many generations of wheat breeders in our country." The Punjab wheat varieties he developed are still being cultivated by farmers because of their stability of performance coupled with excellent grain quality.

Dr. Ram Dhan Singh contributed numerous articles of scientific and popular interest on agricultural subjects to the press media both in English and vernacular languages, during his life time. His creativity was evident from the fact that in his old age he complied with hard labour a voluminous dictionary of roots and words common to English and oriental languages of India, particularly Sanskrit for its publication. Only a few days before his death he had written a letter to a Bombay publisher for the publication of his dictionary. The publisher agreed to publish for the publication of his dictionary. The publisher agreed to publish it but there was nobody to sent the manuscript for its publication after his death as Ch. Ram Dhan Singh was living alone at his residence in old days. Receiving no response for quite sometime the publisher himself came from Bombay to collect the manuscript of the dictionary. By that time somebody had disposed of all his books and manuscripts of the dictionary as a waste. Not even a single copy of the manuscripts was traceable. The publisher went back empty handed. Alas ! the hard labour of this giant scientist went into smoke without benefiting any body.

Rao Bahadur Dr. Ram Dhan Singh made it a habit of Gold medal donations to meritorious students for which he would donate s specific amount of money to encourage the budding and talented students. In this context, he donated Gold medals to P.A.U. Ludhiana and Chhotu Ram Arya College Sonipat. Besides, he would contribute a lot of money as scholarships for upcoming poor and brilliant students. Whereas, he himself led an extremely simple life. Thus he maintained a noble tradition of philanthropy throughout his whole life.

Death, an inevitable and invincible divine force laid its hold on Dr. Ram Dhan Singh also and the mighty soul, the Bhishampitamah of Agricultural research, left for heavenly abode on 17th April 1977. On that day his age was 85 years 11 months and 16 days. A large number ofpeople attended "Tehrvi" at his house, Model Town No. 227, Sonipat, on 29th April 1977.

References

1. Personal letter of Rao Bahadur Ram Dhan Singh, year 1974, P-I
2. Encyclopaedia Britannica, V-13, Chicago : Encyclopaedia Britannica, INC, William Beton Publishers, 1973, P-603-04
3. Personal letter of Rao Bahadur Ram Dhan Singh, year 1974, P-I
4. Randhawa, M.S. : A History of Agriculture of India, V-IV (1947-1981) New Delhi : I CAR, 1986, P-418
5. Personal letter of R.B. Ram Dhan Singh, Year 1974, P-I,
6. Encyclopaedia Britannica, V-18, Chicago : Encyclopaedia Britannica, INC, William Benton, Publishers, 1973, P-883
7. Randhawa, M.S. : A History of Agriculture of India, V-III, (Modern Period) New Delhi : ICAR, 1983 P-303, 318.
8. Birth Centenary Celebrations Rao Bahadur Ram Dhan Singh Lecture No. 2 delivered by Dr. M.V. Rao, V.C., A.P.A. University, Hyderabad, at 33rd All India Wheat Research Workers Workshop, P.A.U. Ludhiana, August, 1994, P-4.
9. ibid, P-5.
10. Randhawa, M.S. : A History of Agriculture in India, V-III, New Delhi : I.C.A.R., 1983, P-314.
11. Ibid, P-342; Pal, B.P. : Wheat; N. Delhi : I.A.R.I., 1966, P-109.
12. Shiva. N. Malik. Dr. Ram Dhan Singh : A Pioneer Agricultural Scientist, 2002.
13. 13 Encyclopaeida Britannica, V-18, Chicago : Encyclopiadia Britannica, INC, William Benton, Publishers, 1973, P-883.
14. Personal letter of Rao Bahadur Ram Dhan Singh, year 1974, P-I.
15. First interview with Dr. P.S. Lamba, Ex-V.C. at his residence, H. No. 51, Defense Colony, Hisar on dated, 10-2-2001.
16. Sattar, Abdus : Fifty years Notes (Cereals and pulses : Introduction) , Lyallpur Department of Agriculture, West Pakistan, 1960, P-I.

17. Paddayya, K. Joint Director, Deccan College Pune Office letter No. 701-KP-1295, dated 6th November 2001 (originally established in 1821 as Hindoo College, renamed as Poona College in 1842 and subsequently renamed as the Deccan College in 1864).

18. Nandal, D.S. and Rana, Z.S. Eds : Rao Bahadur Dr. Ram Dhan Singh Commemoration Volume-I, September 7, 1996 (Message of Sh. Kanwar Singh)

19. Pal. B.P. : Wheat, New Delhi : ICAR, 1966, P-151.

20. Letter of Dr. Mukhtiar Singh (Retd.) Director, CPRI, Shimla Dated July, 27 1998, P-I.

21. Cereal Section Brochure, 1950-51, P-2.