https://doi.org/10.29321/MAJ.10.A04466

Improvement of the "Patcha Jonna" or yellow Sorghums of the Cuddapah and Kurnool districts (Madras)

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The "Patcha Jonna" (Yellow Sorghums) tract of the Nandyal valley is bounded on the North by the river Thungabhadra and extends beyond the river Pennar, in the South, while on the East and West it is bounded by the chains of the hills, "Nallamalais" and "Yerramalais" respectively. Jonna is the staple food crop of this tract, which comprises of Cuddapah and Kurnool districts; where normally 8,00,000 acres are anually sown under this crop. From the nutritional point of view, *jonna* is given a rank next to wheat and is considered better than rice on account of its protein and Vitamin B-1, contents. In forming "well balanced diet", the introduction of millet to a limited extent at the expense of the rice is found to satisfy all the essential food requirements.

Investigation on the "Patch Jonna" crop was taken up at the Agricultural Research Station, Nandyal with a view to evolve high yielding strains of good quality grain and straw suitable for the varying soils of this tract. In the earlier years, of the opening of this station (1906 — 1910) several varieties like "*Venna Mudda*", "*Chitta Patcha*". "*Zinkapuri*", "*Tella Jonna*" etc., were tried both in early and late seasons for yield tests. As a result of these observations it was finally decided to grow "*Cheruku Patcha Jonna*" (sweet stemmed sorghum) in September season. T-6., a selection from "*Cheruku Patcha Jonna*" was evolved in the year 1914 and was under distribution for nearly 20 years since 1920, in the entire "Patcha Jonna" area. It however failed to establish itself over the entire area and was found to survive in a few localised places where soil and climatic conditions suited the strain. From the year 1931, selection work was taken upon this station on an intensive scale. Nearly 5,000 selections were tried for grain yields for the last 15 years. As a result of these efforts there are now several valuable types which vary in duration, shape and nature of the earhead, sweetness of the stem and grain colour and grain size characters. The pick of these strains evolved on this station are tried under district trials in cultivator's lands in Cuddapah and

Kurnool districts for three or more seasons. These aspect of studying the suitability or otherwise of a strain to the locality, formed an important item of work of this station, as a first step towards the spread of a strain in this tract.

With a view to find out the reaction of sorghum strains evolved on this station to variations in soil in the Kurnool and Cuddapah districts, a detailed examination of the existing agricultural varieties and practices of the "Patcha Jonna" area was made. It is found that there exist many differences in the several agronomic aspects of raising this crop mainly due to soil and climatic variations. A detailed examination of the local varieties of *Jonna* crop grown in this area revealed that they vary widely though essentially they are all classified as "*Patcha Jonnas*" from the grain colour. The local varieties are the outcome of long continued natural selection and cultivation through generations. Such of those types as could adopt themseves to the variations in climate and soil fertility, survived in homogenous patches and finally settled down in their respective areas as eco-types. The entire area is broadly classified into five distinct zones, each of which differ in the nature of their soils, rainfall and other environmental factors, varieties grown and agronomic practices adopted. The particulars of these five zones are givan below :—

Zone No	Taluks	Area in lakhs of acres	Name of Zonal vaiety
1. Northern Zone	Kurnool and Nandikotkur	1	"Gundu Patcha Jonna"
2. Western Zone	Dhone, Pattikonda and a portion of Kurnool	1½	"Mungari Patcha Jonna"
3. Central Zone	Nandyal, Koilkuntla Siruvel, Jammalamadugu and a portion of Pulivendala	3	"Cheruku Patcha Jonna"
4. Southern Zone	Proddatur, Cuddapah, portions of Pulivendala and Badovel	1½	"Oola Patcha Jonna"
5. Eastern Zone	Markapur and Cumbum	½	"Punasa and pairu Jonna"
6. Other scattered areas		½	"Tella and Yerra Jonna"
	Total	8	lakhs of acres

It was not possible to evolve a cosmopolitan strain to suit all the above zones. In the absence of regular substations for

tackling the problems of these areas on a regional basis, it was decided in 1940 to take up the work for these five zones at the Agricultural Research Station, Nandyal itself consistent with the limitations of the staff and equipment provided on this station and pending further future expansion.

The material gathered from these zonal areas was worked up and tested on this station with the respective "Locals" as controls, with a view to assess the yielding behaviour of all the biotypes from the intial stages of trials. Such of the high yielding selections, which satisfied all the local requirements in this crop were taken back to their respective original areas for trial on ryots' lands. As a result of this, we have now on hand 9 strains under distribution in the several zones of this "Patch Jonna" tract. The details regarding these strains and the zones, wherein they are under distribution are given below:—

Strain No.	Nature of stem	Duration in days	Panicle shape & compactness	Grain size & colours	Acre yield of Grain / Straw	Other details
No. 1	Sweet Juicy	115	Compact cylindric	Bold Lustrous yellow	650 / 1500	Suitable soils to in Nandyal, Siruvel Koilkuntla and Jammalamadugu taluks. Gives 10% increase in grain yields over local.
No. 2	Sweet Juicy	115	Compact oval	Bold yellow	1000 / 2000	Suitable to soils of Nandikotkur & portions of adjoining Kurnool, taluk where "Gundu Patcha Jonna" is grown. Gives 15% increase over local,
No. 3	Pithy	105	Compact cylindric	Bold yellow	700 / 1600	Suitable to soils of medium and poor fertility in Proddatur and Pulivendale taluqs. Gives 10% increase over local. Escapes "Calacoris" attack by its earliness.
No. 4	Pithy	115	Very compact oval & hard	Bold yellow	800 / 2000	Suitable to soils of rich fertility in Proddatur taluq. Gives 10% increase over local.
No. 5	Pithy	110	Compact oval	Bold Good yellow	600 / 1500	Suitable to soils of Cuddapah taluq. Gives 15% increase over local.
No. 6	Pithy	110	Very compact oval & hard	Bold yellow	800 / 1600	Suitable to soils of medium and rich fertility in Chagulamarri firka of Siruvel taluq. Gives 10% increase over local.

Strain No.	Nature of stem	Duration in days	Panicle shape & Compactness	Grain size & colours	Acre yild of Grain / Straw	Other details
No. 7	Sweet Juicy	115	Compact oval	Bold yellow	1000 / 1800	Suitable to the rich soils of Polur, Balapanur village in Nandyal taluq where "Gundu Patch Jonna" is grown. Gives 15% increase over local.
No. 8	Pithy	120	Compact oval	Bold yellow	600 / 1500	Suitable to soils of rich fertility in the pithy area of Pulivendala taluk. Gives 10% increase over local.
N9. 9	Sweet Juicy	115	Compact oval	Medium bold Good yellow	600 / 1590	Suitable to soils of rich fertility in the juicy aria of Pulivendala taluq. Gives 10% increase over local.

There is still a large scope for effecting improvement both over the existing strains and over varieties from untapped areas. With the expansion of work at the Agricultural Research Station, Nandyal, in connection with each of these zones, a stage has now been reached when the work for these zonal areas cannot be continued on these lines as a permanent feature at this station with its limitations. Since the last two seasons, work on this station has been confined to the "juicy" zone, wherein this station is situated. The varieties from the other zones, when tried at Nandyal could not survive on this station in the majority of cases and hence it was not possible to work on them. In a similar manner the varieties bred at Nandyal from the "juicy" zone did not come up well in the other four zones. To overcome this difficulty, it has become necessary to institute local work in each of these zones, so that higher yielding strains may be evolved from each of them to obtain the maximum benefit from the same for these two important millet growing districts and thus help to lower the shortage in sorghum. In the case of the richer and more favoured crops like paddy, sugarcane etc., increase in yield can be obtained by the additional application of irrigation water and manure etc. But in the case of millets which are the main crops in dry lands and which occupy 40% of the cultivated area of the Presidency, no manuring and no watering is given to the bulk of these lands. The only way to improve crop yields in millets is by breeding high yielding strains and making them available to the cultivators.