

Palak variety Thar Hariparna for abiotic stressed hot arid climate

Among the leafy vegetables, palak (*Beta vulgaris* var. *bengalensis* Roxb) is the most adaptive plant but was not much exploited for developing better yielding genotypes suited to the abiotic stressed production sites. Its tender leaves are used extensively in both fresh and dehydrated forms. Thar Hariparna is developed through selection from native population of palak with better plant growth and bigger leaf size. It is recommended by ICAR-CIAH, Bikaner for October sowing and leaf harvesting from November to March under hot arid climate. Light green–dark green colour leaves are big, glossy, smooth, thick, soft and juicy. It yields high quality marketable leaves (154.72 q/ha) in sandy soils with pH range 8.0-8.5. Quality seed production is profitable.

PALAK or spinach beet (*Beta vulgaris* var. *bengalensis* Roxb) is most valued and nutritious leafy vegetable. Mostly, small to medium size leaves are used in delectable preparations including fast-food. For its cultivation, region-specific varieties are preferred in the country. Besides, native seed from the open-pollinated landraces is widely used in most of areas for home gardening or limited production. It is also grown under hot arid climate as winter season crop.

Background information

Palak is the most adaptive and cost efficient leafy vegetable but has not been in priority for harnessing its regional variability to develop suitable varieties under hot arid conditions. While conducting surveys for arid vegetables diversity from 1994-1999, two leaf forms i.e. medium sized (*badi* palak) and small thick (*chotti* palak) were recorded and found growing scattered in peri-urban locations of the north-western parts of Rajasthan. Realizing the potential of regional crop diversity under dry-land climate, population samples were collected from traditional *bari* fields. Collected accessions were studied in 2001 and unique material was isolated based on growth,

leaf size and quality, and compared with Jobner Green.

From the second year of evaluation, elite individuals with vigorous initial growth under high temperature and superiority for fresh leaf quality were marked in the open-pollinated population of potential germplasm. Best performing marked plants were permitted for seed production (eliminating non-desirable) and this was adopted for four generations to improve the population. The purification over the years followed by selection and evaluation under hot arid environment resulted in the stabilization of palak AHLP-1 producing excellent quality leaf. From 2014-2016, line AHLP-1 was tested at CIAH and farmer's field to assess marketable leaf and seed yield potential, acceptability of produce and promotion of native genotype under abiotic stresses and resource constraint production sites.



Initial plant growth of variety Thar Hariparna

Thar Hariparna

Palak variety Thar Hariparna is a selection and recommended by ICAR-CIAH, Bikaner in 2018 for cultivation under dry-land climate. It is trait-specific and first time bred through use of native germplasm for harvesting better marketable quality and big sized leaf under extremes of temperatures and abiotic stressed conditions. Thar Hariparna exhibits very good initial



Leaf of palak variety Thar Hariparna

growth for tender leaves and first harvesting starts at 35–40 days with October sowing. Tender leaves at marketable harvest are of 9.81–12.54 cm length, 5.72–8.11 cm width and 1.748–1.838 g weight. For fresh marketing, weight of 100 leaves is 174.8–183.8 g. Light green to dark green colour and bigger sized leaves are glossy, smooth, thick, soft and juicy.

For tender leaf crop harvest, plants are vigorous in growth and high yielding (2.85–4.12 kg/plot of 2 × 2 m). Leaf harvesting at regular intervals of 3–4 days gives better quality marketable yield and more number of pickings (7–9) starting from end of October to March. Marketable leaf yield potential is 128.48–235.84 q/ha with the varying cultivation methods (bed, channel, mini-sprinkler and drip technology). Fresh leaf harvesting at 40, 50, 60 and 70 days is found optimum for better plant growth and seed yield. For seed production, inflorescence appears with the end of February, maximum flowering in March and seed maturity in the April. Plant produces mature leaves of size 19.9–26.5 cm length and 15.3–20.4 cm width. At maturity, plants attain 160.6–210.3 cm height and length of inflorescence is 28.7–50.4 cm. Seed yield is 12.45–16.56 kg per 250 sq m plot area.

Production technology

Field preparation: Systematic experimentations adopting check-bed, furrow, channel, drip and sprinkler method of vegetable cultivation at CIAH, Bikaner resulted in standardization of crop specific production techniques and recommended practices for palak. In the thoroughly prepared field and lay-out plot, check-beds (2 × 2 m), furrows (25–30 cm deep) and channels (50–60 cm wide) are prepared in a continual manner which are of about 25 m length on one-side of water supply-line either by flow or pressurized method using laterals for drip or mini-

sprinklers. For drip technology, channels after fertilization are converted into seed-bed where lateral pipes of 14–16 mm size and 4 lph in-line emitters at 30–50 cm distances are laid-down at one metre distances. Seed sowing is done on both the sides of laterals for leaf crop. On 2.0 m apart lateral pipes, mini-sprinklers are fixed at 2.0 m distances and furrow method is practiced. Furrow sowing and flood method is practiced in check-bed and channel technology. Here, furrows and channels are fertilized with FYM (50 q), vermi-compost (5 q), DAP (100 kg), SSP (100 kg), urea (50 kg), MOP (50 kg) and mixed-leaf compost powder (100 kg) as basal application per hectare in the end of September.

Sowing technique: For line sowing, 12–15 kg/ha palak seed is enough and it should be treated with fungicide. Seed is sown at 15–20 cm distances in furrows of 25–30 cm apart for fresh leaf production. For seed crop, plant to plant and row to row spacing of 30–50 cm × 60–100 cm is better. Among flow irrigation, channel technology is best in which two furrows are made at inner-down slopes for leaf-crop whereas one furrow in centre is made for seed-crop.



Cost efficient mini-sprinkler technology for palak production

Both drip and mini-sprinkler systems are better under pressurized method. With drip technology, furrows are made on both the side of lateral line and seed is sown near to drippers. With mini-sprinklers, regular furrows are made at requisite distances. At each sowing point, 3–4 seeds are sown and thinning is done at 18–21 days allowing 2–3 healthy plants/point. The crop is irrigated at an interval of 7–8 days by flood method only in the channels, and 1.5–2.0 hours at 3–4 days with drip and 7–8 days with mini-sprinklers under the sandy soils of Rajasthan.

Intercultural operations: Manual hoeing and weeding is done at 18–21, 30–35 and 45–55 days of growth and at the same time-period, remaining quantity of 50 kg/ha urea is also applied with three split doses as initial plant growth, after first and third harvesting of tender leaves in palak. For harvesting of greens/leaves, there is no incidence of insect-pest and disease. It is also advised not to use any pesticide/fungicide in the crop grown for leaf purpose as it is consumed fresh. However, in



Marketable quality harvest leaves



Marketable harvest stages of palak with mini-sprinkler technology



Dehydration use stage palak leaves



Plant growth of Thar Hariparna for seed crop



Palak crop for seed production with drip technology



Seeds of palak variety Thar Hariparna

seed crop, one prophylactic spraying of insecticide is done with the emergence of inflorescence for managing aphids and minor insects for quality seed production. For better quality marketable yield, tender leaves should be harvested at 3-4 days interval and graded (A – small and B – big) for higher premium. Palak is regional preferred crop and the variety Thar Hariparna is much liked for fresh leaf culinary and dehydration

and therefore a revenue of ₹ 1,10,000-1,40,000/- per ha can be obtained.

For further interaction, please write to:

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SUCCESS STORY

Protected cultivation of cut-carnation flower (KVK, Solan)

Shri Vikrant Thakur belonging to Kothi village block Solan of Himachal Pradesh used to cultivate flowers like rose, chrysanthemum, hydrangea, and exotic vegetables in his polyhouse since 2009 in 300 m² of area. He was not able to get good income. He shifted to Carnation (*Dianthus caryophyllus*) with the support of financial institutions under the technical guidance of KVK, Solan in 2013. Now the farmer has brought 10,000 m² of area under carnation and has become an inspiration for the young farmers. He is following modern technologies like application of GA₃ 100 ppm after first pinch and when axillary shoots are 8–10 cm in length,, drip irrigation, mulches, soilless media, growing bags etc. He is producing on an average 37 lakh cut stems/ha and earning approximately about 30 lakh from the cultivation of carnation per year. He has built rain water harvesting structures by making small poly-lining ponds. Now the farmer is self-sufficient and storing 85 lakh litres of water for the cultivation of flowers in polyhouse. He has permanently employed 15–16 local workers to carry out all the cultural operations in cultivation of flowers. He has been guiding many youths of the district.



A view of carnation under polyhouse of Shri Vikrant Thakur

Source: ICAR Annual Report 2021-22