

Baby corn (*Zea mays* L.): A means of crop diversification under temperate conditions of Kashmir.

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Kashmir comprises a major portion of the temperate area of India situated in its northern most part covering an altitude range of 4500-9000 feet amsl. Main constraints to development of agriculture is the short favourable growing season together with remoteness of the region hence has restricted the agriculture just to few cereal and vegetable crops. However, climatic conditions that prevail here ensure the quality production of almost all agricultural commodities. Thus, in order to make agriculture in the region a profitable enterprise farmers are willingly adopting high value cash crop viz., cut flowers, temperate fruits, saffron and to tap the advantage of the off season market with the rest of India.

In the last one and a half decade baby corn has emerged worldwide as one of the high value crops due to its high nutritive value, exotic taste and most important to mention is the high demand by the foreign tourists. Baby corn (*Zea mays*) refers to whole, entirely edible cobs of immature corn harvested just before fertilization at the silk emergence stage (Galinat, 1985). The standard of living is changing fast and even the demand from local tourists for said corn is felt from every corner of the belt. Its importance in sandwiches, soups, pizzas, vegetables and as salad has taken a boost. It has the potential of production of high biomass within a very short spell (60-70 days) and can serve as fresh fodder in the region as well for which there is a high dearth. To sustain the heavy cattle population in the region baby corn can provide a valuable supplementary source of green fodder particularly for milking animals in the summer months where as other valuable fodder crop like alfalfa, lucerne along with rice straw can be fed during the lean season (October-March) when the freezing temperatures set in.

Maize production under cold temperate conditions is frequently challenged by various factors. The first and foremost of them is the prevailing of short growing season as a result of

which there is high dearth of fodder. Further the heavy cattle population and growing of other non economical crops forces the main occupation of the people i. e farming to dismal returns. High biotic and abiotic stresses more particularly *Turcicum* leaf blight and drought prove economically damaging but at later stage of crop growth. The scope, potential and success of the baby corn lies with high demand from tourists, hoteliers and even from homes because the standard of living is growing fast. Besides Kashmir being hub of quality crop production owing to physiological reasons like low night temperatures that affect the biochemical changes. It allows the accumulation of more hexoses (glucose and fructose) and preventing their conversion to starches, thus adding flavor and taste. Taking these facts into consideration the commercial cultivation of baby corn under temperate conditions of Kashmir can provide a profitable alternative for crop diversification, value addition and establishment of small scale processing units. Having the status of number one tourist state of India and taking into consideration the heavy influx of foreign as well as tourist from other parts of India, fresh as well as processed baby corn could fetch a handsome price in the local, domestic as well as international market. There are number of success stories of the crop in Thailand, China and other South Asian countries that have emerged as major contenders in the export market (Chutkaew, 1986) . In India even in non tourist areas the commercial cultivation is gaining momentum more particularly around the metros and thus are providing farmers huge profit margins. Cultural practices for baby corn cultivation are very much similar to those for grain maize except for some minor modifications and thus it does not require any special cultivation techniques. Since the crop is harvested much before the grain formation stage, hence there is no risk of crop failure due to temperature stress which usually cause pollen abortion. It also has the added advantage of being a short duration crop which generally take 60-65 days, hence crop can be harvested for several months subject to the manipulation of sowing dates or nursery beds are raised of seven days interval and then transplanted continuously (Miles and Shaffner 1999).

In view of the above facts, potentialities and prospects High Altitude Maize Research Sub Station, Sagam (7500feet amsl) has taken serious efforts for development of the promising and most suitable varieties (cultivars) highly adopted under such conditions for baby corn production. Many varieties of maize (composite and hybrids) were evaluated for baby corn production. The materials which are continuously being received from CIMMYT (Mexico) and

Directorate of Maize Research (India) were assessed for baby corn production with the typical characteristics of international standard. The main features which are being given due attention are prolificacy (2-3 ears/plant), yellow coloured cobs having neatly arranged rows of immature seeds, tender cobs of 7-10cm length, sweetness, little chaffiness and pleasant flavor so as to fetch a premier price in the market. Hence states the importance of development of specific and best cultivars for baby corn production. The two composites PS-78 and PS-79 and one single cross hybrid I114-2 x I178-1 after a thorough assessment and analysis taking international yardstick for quality baby corn production into consideration have been identified as the promising choices for cultivation under temperate conditions of Kashmir and can definitely provide baby corns of international standard. The two composites belong to specialty corn group (sweet corn) and the hybrid is normal yellow maize. The relative comparison of important characteristics of above mentioned varieties identified for baby corn production is given in the Table-1. Other economic characteristics like biomass yield, benefit-cost ratio are also presented (mean of 2006, 2007 and 2008). The trial has indicated that on an average 500q of green fodder can be obtained per hectare besides the cob yield of 115-120q/ha. This indicates that yield of baby corn in the region is approximately 1.5 times higher than that obtained in Thailand 80q/ha)

Fresh baby corn (sweet corn) is highly perishable in hot weather. For every 5°c increase in pulp temperature sugar breakdown to starch doubles, meaning that baby corn can completely lose flavor in a short period of time. Hence growers are suggested that cultivation of baby corn be taken in areas near to main market or having proximity to tourist places. It can be cultivated in other places also provided there are assured transport facilities for lifting and carrying the same to the consumption markets.

Crop production:

Successful baby corn production relies on, (1) management planning well in advance of sowing so as to ensure that harvesting meets the most profitable market niche and processor schedule.(2) through research to identify market requirements, impediments to production and especially product specification. (3) good cultural management tailored to suit particular cultivar with special attention given to harvesting technologies, establishment, plant population, fertilizer, irrigation, soil management and pest and disease control (Kotch, *et.al*,

1995) . Following cultural practices have experimentally been proved for economic baby corn production.

Crop raising: The baby corn crop can be raised continuously for several months if staggered sowing of 10 days interval is adapted. The first sowing can be done even under protected structures (polyhouses) and its availability can be made even before the normal season.

Fertilizer and weed management: 60 Kg N, 40 Kg P₂O₅ and 30 Kg K₂O as basal dose except nitrogen given in splits with half as basal and half on knee high stage. Atrazine is proving effective against pre-emergent broad leaved weeds.

Seed production: Seed production of varieties identified for baby corn production has been taken on priority in isolations identified by the monitoring team for the purpose.

Thus the prospects of baby corn cultivation in Kashmir appears to be high being the dual purpose crop by harvesting cobs as fresh vegetables and green fodder which is scarce in the region to be fed directly to the cattle or preserved as hay or silage and fed in the lean season. Since Kashmir is a hot spot for both domestic as well as foreign tourists, besides serving the venue for religious and medical tourism, delicacies prepared from baby corn would earn good revenue through the tourism industry, The tourism being the back bone of state economy, the success of the crop could also help to boost the economy of the local farmers and even the urban people through kitchen gardening can earn good marginal returns by following such crop which need less input but more returns. This can also provide an opportunity for crop diversification and besides can provide impetus for development of dairy industry. Last but not least the cultivation and popularity of such crop can generate plenty of employment opportunities.

References:

- Chutkaew, C. 1986. Progress of baby corn industry in Thailand. The FA0 Expert Consultation on Improved Production of Tropical Vegetables. FA0 Regional Office for Asia and the Pacific, Bangkok, Thailand, 16-19 September. 9 pp.
- Galinat, W. C. 1985. Whole ear baby corn, a new way to eat corn. Proc. Northeast Corn Improvement Conf., 40:22-27.

Kotch, R. S., J. H. Murphy, M. D. Orzolek, and P. A. Ferretti. 1995. Factors affecting the production of baby corn. *J. of Veg. Crop Prod.*, Vol. 1(1):19-28.

Miles, C., and O. Shaffner. 1999. Baby Corn Research Report. Washington State University Cooperative Extension, Lewis County.8pp.

Table-1: Relative comparison of different morpho-agronomic and quality characters of the varieties identified for baby corn production (Mean over years: 2005, 2006& 2007)

S. No.	Quality characters	Varieties		
		PS-78	PS-79	114-2 x 178-2
1	Days to 50% tasseling (DAS)*	60	64	67
2	Days to 50% silking (DAS)	62	66	70
3	Days to first picking	62	67	70
4	Colour of the cob	Yellow	Yellow	Cream yellow
5	Taste of the cob	Sweet	Sweet	Moderately sweet
6	Average weight of the cob with husk (g) [Fresh]	60.5	65.7	70.6
7	Average weight of the cob (g) [Dehusked, Fresh]	30.4	33.6	35.7
8	Average length of the cob (cm)	8.0	12.3	11.5
9	Average diameter of the cob(cm)	2.10	1.90	2.20
10	Average height of the plant (cm)	180	205	230
11	Cob yield q/ha [Fresh]	100.4	108.3	120.4
12	Fresh fodder yield q/ha	430.0	520.0	580.0
13	Biological yield q/ha (One week after harvesting)	140.6	170.5	190.6
14	Benefit/cost ratio	2.70	2.75	2.80

*DAS = Days after sowing