

## Does the Bt cotton maintain the cry I Ac toxin after pruning

New leaves and square that emerge after pruning, synthesize and maintain cry I Ac toxin in the same level to that of the main crop and hence devoid of boll worm attack in pruned crop also.

## Will the quality of lint be affected in pruned crop?

The lint quality was not affected to any extent by pruning technique. The fibre quality index was not significantly altered between the lint of main crop and the pruned crop.

## How these techniques useful in mitigating the climate change?

Converting atmospheric Carbon to increase plant biomass through photosynthesis is the major strategy to mitigate climate change. Cotton thrives well under elevated CO<sub>2</sub> upto 600ppm. Hence, it can sequester more carbon from atmosphere during its lengthy growth and development phase. Besides, biomass accumulation can be significantly increased by increasing the cultivation intensity throughout the year by pruning technique soon after the first harvest by avoiding the summer fallow. The sympodial branches and leaves excised during pruning helps as mulching agent for few weeks before it gets degraded into the soil enriching the soil carbon, Pruning technique reduces the cost of cultivation by skipping land preparation for sowing which in turn avoids tractor driven implements saving fossil fuel by 50 lit/ha, which otherwise could have released tones of carbon to the atmosphere. Also good amount of N<sub>2</sub>O is not released from the soil by not disturbing the soil. Apart from this, reduction in pesticide spray, weedicide, irrigation and fertilizer use etc indirectly helps in mitigating the climate change effect particularly in their process of manufacturing. Further, one cycle of main crop followed by a pruned crop will give approximately about 10 tonnes of additional biomass per hectare. This amounts to 3.9 tonnes additional carbon sequestered and accumulated in biomass in a growing season. In this way pruning technology not only increases yield by 50-60% in addition to main crop per ha per year and also increases the biomass sequestration of carbon and store them in significantly.

## Can this technique be implemented by farmers?

Most of the cotton farmers do not plough the field soon after harvest and many a times allow the cattle to eat the left over loppings of cotton. Under favourable condition new flushes are putforth leading to few harvestable bolls similarly. Pruning technique involves mechanical removal of loppings and main stem above 45 cm from soil to give rise to more sprout leading to sympodia with good harvest. Progressive farmers under assured irrigation are implementing this technique of pruning to realize additional yield. Due to many advantages as mentioned above, dissemination of this technique to farmers will not only boost the production and productivity but also play an important role in mitigating climate change phenomenon.



Pruned points



Pruned 50 days



Pruned cotton plant



Pruned 20 days



Sown 50 DAS

Published under the project  
National Innovations on Climate Resilient Agriculture (NICRA)

## Pruning in cotton: A promising technology to increase yield and mitigate climate change



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## Pruning in Cotton

Cotton productivity has stabilized between 470-500 kg/ha during the past years, in spite of intensive cultivation techniques like growing high yielding BG II hybrids, sucking pest control with new molecules etc. and precision cultivation techniques. With limited scope for increasing the area under cotton, the only option to achieve the production target is by vertical growth beyond the potential yield of the currently available technology keeping in view of the growing population and climate change phenomenon. Any technology that could increase productivity per unit area per unit time and adopting or mitigating climate change will be a worthwhile attempt to increase production and productivity. Exploiting the perennial and indeterminate nature of cotton for second fruiting cycle in cotton by pruning technique was found to be a potential area of research to increase productivity of cotton. Pruning technique gives additional yield and also helps in mitigating the climate change effect by sequestering more carbon from the atmosphere and fix in the form of biomass. This being a new technology, it is felt that there is a need to disseminate the technique involved and clarify the doubts in the form of questions and answers.

## How cotton crop is suitable for pruning technique?

Cotton is grown in tropical and sub tropical climate and the present day cultivars are not very sensitive to photoperiod. Cotton by nature is a perennial with indeterminate growth habit wherein the vegetative and reproductive growth progress simultaneously. Although cotton is raised as a *kharif* season crop so as to coincide with favorable rainfall and temperature for maximum productivity it can also be grown throughout the year where ever low temperature is not a limitation. Due to its good rooting system it could mine nutrients and water from deep layers of soil and sustain in the field for longer period. It has good yield compensating mechanism. For instance, in the event of crop failure either due to biotic or abiotic stress it rejuvenates to produce fresh fruiting structures during favourable condition to end up with acceptable yields. These inherent advantages can be exploited favourably to extend the cotton crop for a second fruiting cycle by pruning technique.

## What is this pruning technique?

This technique involves removal of all redundant branches and leaves of cotton plants 45 cm above the soil, soon after harvest. This pruning technique can be advocated even before harvest in the event of a total crop failure due to severe bud and boll shedding due to biotic or abiotic stress. Pruning of cotton leads to sprouting of dormant buds from the axil of leaves, branches and nodal points of the stem within 10-15 days. These sprouts develop into sympodial branches with square formation within 40-50 days and matured bolls for harvest by 120 days after pruning.

## How pruning is different from ratooning?

When the crop is excised completely at 2-4 cm above the soil it is called ratooning as in the case of sugarcane crop where as pruning in cotton involves removal of all redundant branches and leaves 45cm above the soil after harvesting the main crop. Consequently, numerous sprouts appear leading to sympodial formation.

## Why ratooning in cotton did not become popular in the past?

Ratooning technique was adopted in the past but could not sustain due to poor management practices, lack of proper technique to induce more sprouts. Control of insect pest at later stages was a major problem particularly the pink boll worm infestation.

## Will pruning technique encounter similar problem?

Pruning technique has the advantage of giving rise to many sprouts from the leaf axil, nodal points and ultimately 6-8 sympodial branches reaches the harvest stage. New molecules of pesticides now available in the market can easily overcome the pest problem in cotton. Bt cotton has the inherent mechanism to release cry toxin to keep boll worm attack at bay.

## Is pruning technique practiced in other cotton growing countries?

Pruning technique is been practiced in other countries like Kenya, Israel, Australia and Pakistan in the form of ratooning. In China pruning has been followed widely since many years.

## When pruning has to be effected?

Pruning can be effected soon after the harvest of the main crop or under favourable condition. It can also be advocated as an when there is a total crop failure either due to water logging, severe drought or due to biotic stress. Pruning was found to be successful in both summer and winter crop.

## Is this technique specific to certain genotypes or hybrids?

Our experiments have shown that all genotypes and hybrids including Bt cotton respond favorably to this pruning technique depending upon the past management practices.

## Is it possible to have more than one pruning cycle?

Second pruning was fixed and results show that the plants become weak with smaller size bolls. However, attempt can be made to yield better by good agronomic management practices.

## Does pruning technique aggravate the problem of pink boll worm?

In ratooned cotton crop pink bollworm was aggravated at later stages in the past. However today we have new molecules of pesticides and Bt BG II cotton which could easily alleviate the problem of pink boll worm where it exists.

## What is the additional nutrient requirement of pruned crop?

Additional requirement will be similar to a fresh seeded crop and all management practices need to be followed.

## What are the major advantages of this technique?

This technique of pruning have many advantages like no field preparation, less weed control problem, less pesticide usage, less fertilizer use, less labour force during the cropping season and short life cycle of the crop with reduced cost of cultivation. It is almost a zero tillage crop hence emission of N<sub>2</sub>O from soil is avoided. Additional yield of 50-60% to that of main crop could be harvested.