

Traditional and Cultural Agricultural Practices for Ginger (*Zingiber officinale*) Cultivation in Jhadol Tehsil, Udaipur, Southern Rajasthan, India: (Field Report)

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Abstract

Traditional farming practices or Prominent traditional agricultural practices include agroforestry, intercropping, crop rotation, cover cropping, traditional organic composting, integrated crop-animal farming etc.

The study area of this paper includes the tribal block of southern Rajasthan of Udaipur district.

In the present paper attempts were made to document different cultural and agricultural practices followed by ginger farmers in the study area. Alternate/intercrops and crops grown with ginger, storage practices of ginger seeds for next cropping season, organic materials used as fertilizer or weed killer for ginger cultivation were is also stated in this paper.

Information were gathered through a questionnaire of about 25 - 30 questions related with ginger farming, hurdles/obstacles in ginger crop cultivation, important diseases of ginger, harvesting, storage and marketing of ginger etc. along with PIC (Prior Consent Information) forms.

In the study area crops like wheat, paddy, garlic, mustard were rotated with ginger whereas crops like maize, soybean, red sorghum, colocasia and vegetables like chilli, brinjal and tomato were grown with ginger. Another important practice followed by the ginger farmer was the use of *Crotalaria* seeds, locally called as 'hann' was also mentioned in the present paper. Local farmer Mr. Panlal explained that *Crotalaria* seeds were sown in the field prior to ginger sowing. He also mentioned importance of *Crotalaria* plant as it controls the problem of ginger rot and also promotes ginger growth. Storage practices of ginger seed were also documented in the paper.

Keywords: Alternate Crops; *Crotalaria*; Ginger; Traditional Practices

Introduction

Ginger (*Zingiber officinale* Rosc.) belongs to family: *Zingiberaceae*. It is an herbaceous perennial crop which is used as a spice. The rhizome or modified underground stem of ginger is used worldwide as a spice for flavouring a multitude of foods and food products, alcoholic and non-alcoholic beverages, confectionary and pickles as well as in pharmaceutical preparations and traditional medicines. Ginger is currently used in the food, beverage in the manufacture of other components like oil, oleoresin, essence, soft drink, non-alcoholic beverages and effervescent soft drinks and in cosmetics industries etc [1].

Ginger is an important medicinal as well as a cash crop of India. Better to say that it is a multipurpose crop of commerce that earns an ample amount of foreign exchange for the country [2]. The rhizome or modified underground stem of ginger is used worldwide as a spice for flavouring a multitude of foods and food products, alcoholic and non-alcoholic beverages, confectionary as well as in pharmaceutical preparations and traditional medicines [3,4]. It has been credited with a multitude of phytotherapeutical activities like curing muscular aches and pains, congestion, coughs, and sinusitis as well as exhibiting anti-inflammatory, antitumor, anti-diabetic and anticancer effects [5]. In India, China and Japan people are used ginger as food and as medical substances curing colds, cough, vomiting, dizziness, hypertension, impaired vision problems etc. Indian Ayurvedic treatment for digestion, fever and stomach diseases, ginger is used heavily in the production of medicines. Aromatic and medicinal oil extracted from the ginger, helps in preparation of ginger beer and ginger wine. Ginger powder used in the spices and other edible products like biscuits, cakes and pickle.

India is the largest grower of ginger and also the producer of dry ginger in the world (Bag, 2018). It is cultivated by all tropical and subtropical countries in the world, much of it is produced in India. In India, states like Kerala, Arunachal Pradesh, Orissa, Meghalaya, West Bengal are widely cultivated and Tamil Nadu, Andhra Pradesh and Karnataka are cultivated in the lower area. Ginger is also grown in Gujrat. In Rajasthan ginger is not grown like other above mentioned states but in Rajasthan ginger crop is cultivated mainly in Udaipur, Dungarpur and Baran districts, producing good amount of ginger previously. In Udaipur district two tehsils namely, Jhadol and Gogunda have the maximum area under ginger cultivation. The climatic conditions of Udaipur district are most suitable for cultivation of ginger, as it has warm and humid climate and porous soil for good growth of ginger rhizomes. Jhadol area of Udaipur is known to be inhabited by several tribes such as Bhils, Gadia Lohars, Garasias, Sahariyas, etc. The economy of tribals is predominately agriculture where they were using ginger crop previously but due to soft rot disease of ginger they owe the ginger cultivation.

India, more than 75 named varieties of ginger are under cultivation, in addition to about 500 local varieties that are being maintained and cultivated in various parts of the country [6]. Although several cultivars of ginger are grown in the different ginger growing areas in all over the India. Some of the prominent indigenous types are Maran (Assam), Kuruppampadi, Ernad and Wynad local (all from Kerala). China and Reo-De-janerio are two important varieties of ginger. Other important varieties grown in India are Maran, Assam, Himachal, Kuruppampadi, Wynadlocal, Suprabha, Suruchi, Suravi, Himgiri, Varada, Mahima and Rajasthan etc. Besides all, local ginger are also grown in different places which are not the hybrid variety but are preferred by the local farmers of that vary area. In Jhadol Tehsil local ginger/Desi ginger is cultivated since initial. This ginger is very good in its pungency and active metabolites.

Ginger grows best in warm and humid climate. For successful cultivation of the crop, a moderate rainfall at the sowing time till the rhizomes sprout, fairly heavy and well-distributed showers during the growing period, and dry weather with a temperature of 28^o to 35^oC for about a month before harvesting are necessary. Well-drained soils like sandy or clay loam, red loam or lateritic loam and a friable loam, rich in humus are ideal.

In Jhadol ginger sowing starts at the mid/end of May and starting of the month June. It grows for about 7 to 8 months and then harvested and marketed to the local market of Savina Mandi Udaipur. The climatic conditions as well as soil are best suited for the growth of ginger.

Although the climate and soil are best for ginger cultivation in Jhadol Tehsil, instead of that most of the farmers gave up its cultivation because of a destructive disease known as soft rot. The disease is spreads very fast in warm and humid conditions, it may assume serious proportions and cause significant losses. It is prevalent in almost all ginger growing areas of the world. The disease was first recorded during the year 1907 from Surat, Gujrat, India [7].

Soft rot disease of ginger crop caused by *Pythium* can infect the crop throughout the growing period. Almost all parts of the plant including sprouts, roots, developing rhizome and collar region of the pseudostem are also vulnerable to infection.

Since last 10 years the production and area under cultivation of ginger is decreasing very fast in Jhadol due to the soft rot disease of rhizomes.

Materials and Methods

All the members of RUSA team were actively involved in the discussions, observations and field survey along with the farmers and local people. PIC (Prior Information Consent) forms were filled with the farmers and local people of Jhadol and nearby villages. Farms were visited frequently by the team members to get in touch with the crops grown alternate and along with ginger.

Following main aspects were taken into consideration during the visit:

- Crop rotation/intercropping: (Crops grown along with ginger and in alternate with it).
- Storage practices for ginger rhizomes adopted by the ginger farmers.
- Type/s of fertilizers they are using for ginger cultivation.
- Variety/varieties of ginger they are using for cultivation.

Result

The team members of RUSA during a visit fortunately met with a farmer named Ms. Pannalal. He gave the facts and particulars that during last about 10 years most of the farmers gave up the ginger crop due to heavy yield loss. Team collected the samples and identified the causal agent of soft rot disease is *Pythium*. Due to which soft rot in ginger rhizomes occur and the losses reached upto 100% sometimes. The farmers and local people were highly unsatisfied with their yielding as they do not have ginger for their domestic purpose even for to use in the tea.

The crops grown rotated with ginger are found to be wheat, paddy, garlic and mustard and the crops grown with ginger are maize, soybean and red sorghum. The varieties of vegetable crops grown with ginger were colocasia, chilly, brinjal and tomato.

Team members also discussed about the storage practices of ginger and also observed that ginger was stored in small pits inside the huts/kacha house which was well maintained for proper aeration.

He revealed that some of the farmers were using haan as an fertilizer, weedicide/herbicide. After the observation of seeds, plants and pods, RUSA team members found that this haan is actually *Crotalaria* spp. Haan (*Crotalaria*) is grown first in the field then the same field is used to grow ginger. As *Crotalaria* is leguminous crop hence it increases the nitrogenous compound in the soil and increases the fertility of the soil. Legume crops are recognized and valued as "soil building" crops. Growing legumes in the field improves soil quality through their beneficial effects on soil biological, chemical and physical conditions. When leguminous crops are properly managed, they do the following changes in the soil:

- Enhance the N-supplying power of soils
- Stimulate soil biological activity
- Reduce soil erosion by wind and water
- Improve soil structure

- Increase the soil reserves of organic matter
- Increase soil aeration
- Improve soil water-holding capacity
- Make the soil easier to till.

All of the above enhancement in the soil fertility, chemical and physical composition of soil shows that growing *Crotalaria* with ginger is really good for the yield and production of ginger if soft rot is managed anyhow.

Team also talked about the fertilizers they are using for ginger. Farmers revealed that they used purely organic fertilizers made by cow dung and plant debris. They do not use any chemical fertilizers and other chemical agents to enhance the yielding of their crop. Besides above all farmers of Jhadol were using Desi ginger, this type of ginger has high nutritive value and good pungency.



Figure 1: RUSA Team members at one of the visited site in Banswari (Jhadol, Udaipur).



Figure 2: Storage house at the site.



Figure 3: *Crotalaria* spp. (Haan). Left: A plant. Right: *Crotalaria* spp. seeds.

Discussion

From the above field report it was very much clear that the tribes of southern belt of Rajasthan Udaipur of Jhadol tehsil are still using only traditional agricultural practices and not getting enough return from their crops. As ginger is the basic crop in the area but due to only basic practices and lack of knowledge of ginger disease control and management practices they are year by year getting down and owing the ginger cultivation.

During the last ten years more than 60% of the ginger farmers gave up the ginger cultivation. If they get aware by any source they can again start ginger farming and can get good profit. As ginger is a good cash crop it can give a high return to the ginger growers and hence uplift their livelihood.

Conclusion

This work provides an extensive report on the problems faced by ginger farmers. This report may be useful for the government bodies as well as for the researchers working in the agricultural, horticultural and in the field of Mycology. The information given in the present paper will be useful to fight against the situation faced by the farmers.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Authors' Contributions

Conceptualization and designing of the research work (KS); Execution of field data collection (TP, TJ); Preparation of original draft manuscript (TP); Review and editing of manuscript (KS, TJ).

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