

Leaf blotch: Itu toh pata la duita side te bi huru badam nisina rong dagi (spots) dikhe. Itu bimar nalegibole 0.3% mancozeb halibi.

Leaf spot: it appears as irregular sizes brown spots and white or grey colour at the centre of the upper leaves. Spraying of Mancozeb (0.3%) naholile copper oxychloride (0.2%).

Leaf spot: Itu te alak-alak size badam nisina rang dagi aru buga (white) nahoile grey rang uper komali pata te dikhe. Mancozeb (0.3%) naholile copper oxychloride (0.2%) spray kuri dibole lage.

Rhizome rot: Collar region of the pseudostem becomes soft and water soaked yellowing of leaves at base and decaying of rhizomes. Treating the seed rhizomes with mancozeb 0.3% for 30 minutes prior to storage and at the time of sowing.

Rhizome rot: Aduwa guti norom hoikena, pani nishena olai aru guti toh pochai de aru pata khan pila (yellow) hoijai. Gutu toh 0.3% mancozeb 30 mins karone treat kurikena aha sal karone rakhibo lage.

Harvesting and Yield

It takes 7-9 months for harvesting and harvesting time during January to March. Drying up of the aerial portion indicates maturity. Avg. yield of fresh rhizome is 25-30 t/ha.

Haldi khundia aru haldi kiman ulabo

Haldi toh pakibole 7-9 mohina lage aru January-March te haldi khundi loi. Kitia haldi laga patta khan sukhi jabo itu time te haldi khundibole time hoijai. Bishibak ekta hectare mati te 25-30 t guti olai

Storage:

The seed rhizomes should be treated and stored in a clean sack and should be kept in a bamboo rack or stored in a pit covered with soil in order to extend its storage life.

Haldi kineka aha saal nimete rakhibo:

Aduwa guti khan toh dawai milai diya pichete sapha bosta te dhali kena, khuri laga machang upor te rakhibi nahoile bhi mati te gadda khundikena, mati para bon korikena rakhile bishi din rakhibo pare.



Contributed and edited by:
Ms. Aviboli Zhimomi
A.Sarkar
C.S.Maiti

Department of Horticulture
SASRD, Nagaland University

Published by:
AICRP on Spices, Nagaland Centre
Department of Horticulture



PACKAGE OF PRACTICES **of TURMERIC**



Turmeric (*Curcuma longa*) is one of the cash crops mostly in jhum area over the hills of N E region. It is used as condiment, dye, drug and cosmetic in addition to its use in religious ceremonies. India is a leading producer and exporter of turmeric in the world. Meghalaya, Assam Tripura and Nagaland are the major cultivating states of turmeric among NE area.

Haldi rupabole niyom

NE region te, Haldi toh bisi bak Jhum jaga te kure. Itu toh sabji (haldi masala), rong dibole, dawai aru cosmetic banabole cholai aru pooja khan te bhi cholai. Itu duniya te India para sabse bishi haldi olai aru bahar te bhi pathai ase. NE jaga te haldi ula toh Meghalaya, Assam, Tripura aru Nagaland te ase.

Climate and soil

Turmeric is grown in diverse tropical conditions from sea level to 1500 m in the hills, at a temperature range of 20-35^o C with an annual rainfall of 1500 mm or more, under rainfed or irrigated conditions. It thrives best in well-drained sandy or clay loam soils with a pH range of 4.5-7.5 with good organic status.

Hawa pani aru mati

Haldi toh gorom jaga, 1500m uper asol sea level aru temperature 20-35^oC, borokhon sal te 1500mm nahole itu uper te haldi kheti kuribo pare. Balu nathaka, jun jaga te pani jama nakure, mati laga pH 4.5-7.5 aru mol bhal mati te haldi bhal para ulabo.

Varieties

Lakadong and Megha selection-1, are the two varieties suitable for Nagaland condition.

Jat

Lakadong and Megha selection-1, Nagaland nimite bhal jat ase.

Preparation of land

The land is prepared during February-March. The soil is brought to a fine tilth by giving deep ploughing. The beds of 1.0 m width, 30 cm height and of convenient length to be prepared with spacing of 50 cm between beds.

Mati tayari kuri rakia

Mati toh February-March te bhal para khundikena mihin kuribo lage. Haldi bijon rupabole mati toh 1.0m chaura (width), 30 cm ucha (height) aru mati khundia majote 50 cm jaga charibo lage.

Seed material

Whole or split mother or finger rhizomes with well developed healthy and disease free weighing about 35 to 45g are used for planting. The seed rhizomes are treated with *Trichoderma viride* or *Pseudomonas* or mancozeb 0.3% (3 g/L of water) for 30 minutes, shade dried for 3-4 hours. A seed rate of 2500 kg of rhizomes is required for planting one hectare of turmeric.

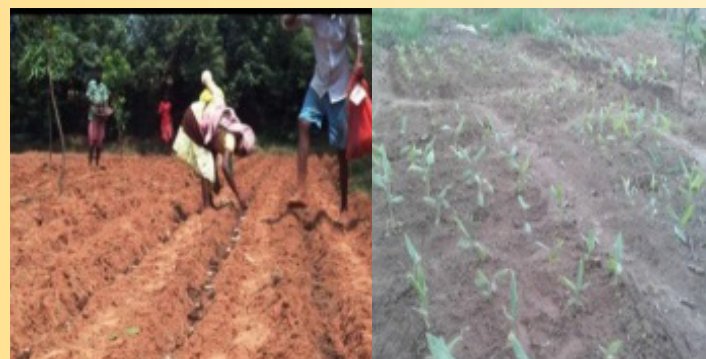
Bijon

Haldi rupabole, pura ama haldi nahoile kati kena bimar nathaka aru sob tokra laga ojen toh 35-45g hobole lage. Bijon toh *Trichoderma viride* nahoi le *Pseudomonas* nahoile mancozeb 0.3% (3 g/L of water) 30 minutes karne treat kuribole lage aru shade te 3-4 hrs sukia dibi.

Seed rate : 2500 kg/ha

Bijon kiman lage : Ekta (1) hectare karne bijon 2500 kg lagibo.

Planting



Due to early rainfall, the crop is planted during April-May with the receipt of pre-monsoon showers. Small pits are made with a hand hoe on the beds with a spacing of 25 cm x 30 cm. Pits are filled with well decomposed cattle manure or compost, seed rhizomes are placed over it and then covered with soil. The optimum spacing in furrows and ridges is 45-60 cm between the rows and 25 cm between the plants.

Kineka rupabo

Pani joldi gira nimete April-May te bijon rupaide. Pharoa pora mati chenda huru huru khundi kena, majote khali jaga 25 cm x 30 cm rakhibo. Aru chenda te sukha mol halidibo, bijon halikena mati para etu bon kuridibo. Line aru line majote 45-60 cm hobo lage aru ghas khan majote 25 cm rakhibo lage.

Manures and fertilizer:

FYM or compost @ 30-40 t/ha during land preparation and 130 kg Urea, 310 kg SSP and 200 kg MOP per hectare are applied in 2 - 3 split doses. Full dose of SSP is applied as basal at the time of planting. Equal split doses of N and K is top dressed at 45, 90 and 120 DAP.

For Organic cultivation: Farmyard manure @ 40 t/ ha along with vermicompost @ 5-10 t/ha and mulching with green leaves @ 12-15 t/ha at 45 days intervals. Add *Azospirillum* and phosphate solubilizing bacteria .

Mol

Mati bana time te guru mol nahoile ghas-pata puchia @ 30-40 t/ ha halibo lage, itu pichote 130 kg Urea, 310 kg SSP aru 200 kg MOP per hectare 2-3 bar bhak kuri kena dhalidibi. SSP pura dose bijon lagabole time te aru N and K 3 times 45, 90 aru 120 din rupa pichote halibo lage.

Dawai nadikena kheta koribo karone guru mol nahoile ghas-pata puchia (compost) @ 40 t/ ha, itu logo kechua mol @ 5-10 t/ha aru sukha pata khan para @ 12-15 t/ha bon kuribo lage. Itu logo te aru *Azospirillum* aru phosphate solubilizing bacteria bhi milaikena halile bhal bhal para ulabo.

Mulching

The crop is mulched immediately after planting with green leaves @ 12-15 t/ ha. Mulching may be repeated @ 7.5 t/ha at 40 and 90 days after planting.



Sukha pata para bon kori rakha

Bijon mati te hala pichote bon kuribo lage, sukha pata khan para @ 12-15 t/ha. Bon aru dibole pare @ 7.5 t/ha 40 aru 90 din ropabo pichote halile bhal ase.

Weeding and irrigation

Weeding thrice at 60, 90 and 120 days after planting and irrigation about 15 to 23 irrigations depending upon the weather and the soil conditions

Nerani aru pani dibole niyom

Bijon dhalia piche te tin (3) bar @ 60, 90 aru 120 din nerani kuri bole lage aru pani dibo lage, din (weather) aru mati (soil) la hisab te.

Mixed cropping

Turmeric can be grown as an intercrop in coconut and arecanut plantations. It can also be raised as a mixed crop with chillies, colocasia, onion, brinjal and cereals like maize, ragi, etc.

Mila-mili kheta

Haldi (Turmeric) toh coconut aru tamul ghas (arecanut) la bhij te bi lagabole pare. Itu logo te mircha (chilli), kuchu (colocasia), pias (onion), bacon (brinjal) aru mukia (maize), atc bi dhale.

Plant protection (Ghas kenika bachabo)



Rhizome rot

Leaf blotch

Leaf blotch: Brown spots of oval, rectangular shapes appear on both sides of the leaves. It can be controlled by 0.3% mancozeb

Pests: Ghas bhitor chenda kuridia poka, rhizome fly, chimti.



Shoot borer

Management:

1. Regular field inspection and maintain cleanliness
2. To expose the soil to sunlight
3. After every two weeks to apply neem cake @ 2 MT/ha
4. Light traps
5. To apply Trichogramma chiloris every week @ 50,000/ha to control lipedopterans

Poka aru kira rokhable:

1. Kheti hodai sai kena sapha kuribo lage.
2. Dhup te mati sukhai dia
3. Hodai dui hapta pichete, neem cake @ 2MT/ha dhali dibi
4. Light traps cholabi
5. Lipedopterans rokhabo nimete, har hapta Trichogramma chiloris toh 50,000/ha dhali dibi.

Harvesting and Yield

It takes 7-9 months for maturation and is harvested during January to March. Drying up of the aerial portion indicates maturity. Avg. yield of 25-30 t/ha of fresh rhizome.

Haldi khundia aru haldi kiman ulabo

Haldi toh khundibole 7-9 mohina lage aru itu toh January-March te khunde. Kitiya haldi ghas sukhijai itu time te haldi khundibole time jaani jai. Ekta hectare kheti te taza (fresh) haldi toh 25-30 tonnes ulai.

Storage:

The seed rhizomes should be treated and stored in a clean sack and on bamboo rack or can be stored by digging a pit and covering it with a soil in order to extend its storage life.

Haldi kineka aha saal nimete rakhibo:

Haldi guti khan toh dawai milai diya pichete sapha bosta te dhali kena, khuri laga machang upor te rakhibi nahoile bhi mati te gadda khundikena, mati para bon korikena rakhile bishi din rakhibo pare.



Contributed and edited by:
Ms. Aviboli Zhimomi
A.Sarkar
C.S.Maiti

Department of Horticulture
SASRD, Nagaland University

Published by:
AICRP on Spices, Nagaland Centre
Department of Horticulture



PACKAGE OF PRACTICES
OF GINGER



Ginger is one of the oldest and an important spice crop of the world. India accounts for maximum production and exporter of ginger in the world. It is used for culinary purposes, in the preparation of medicines and confectionaries, in food processing and beverage industries.

Aduwa rupabole niyom

Aduwa toh duniya te bishi laga aru sabse purana spice bhitor te ekta ase. Desh khan majote, India te hi sabse bishi aduwa (Ginger) olai aru bahar tebhi photai. Aduwa toh sabji kisem kisem banabole, dawai bonabole, mithai bonabole aru juice, pickle khan bonabole cholai.

Climate and Soil

Ginger is a tropical crop requiring warm and humid climate, grow well in areas with annual rainfall between 125 to 250 cm and cultivated up to 1500 m above sea level. It is a shade

loving plant. Deep, well-drained, friable, loamy soil, rich in humus is ideal for ginger. Soil pH of 5-6.5 is considered suitable.

Hawa pani aru Mati

Aduwa toh gorom aru bija hawa pani te bishi bhal olai. Borokhon pani sal te 125-250 cm aru 1500m sea level upor tak aduwa toh ulabo pare. Aduwa toh chaaya bhal lagiya ghas ase. Aduwa toh loamy, mol bishi thaka mati aru pani bhal para ja mati te bhal olai. Mati te pH 5-6.5 thaka toh aduwa karone bhal ase.

Preparation of Land

Land is ploughed well during February-March. Raised beds of 1 m width and of convenient length varying from 3 - 6 m and 15 cm height with spacing of 30 cm between beds for drainage channel is prepared. 15 tons of FYM/ha is then applied. The prepared beds are covered with a plastic sheets for 20-30 days as soil treatment for control of insects, pests and diseases.

Mati tayari kuri rakia

Mati toh February-March mohina te bhal para khundibo lage. Aduwa rupabo karone mati toh 15m uthai kena, 1 m chaura (width) aru 3-6 m lamba (length) banabole lage, 30 cm jaga pani jabole beds khan majote charibole lage . 15 tons/ha mol dhalibo lage. Itu pichete, poka aru bimar nalagibole mati toh plastic sheets para 20-30 din (days) bon kuri kena rakhibo lage.

Varieties: Nadia, Nagaland Red pungent

Jat: Nadia, Nagaland Red pungent.

Selection and treatment of Planting Material

Select healthy rhizomes free from diseases and pests. Sprouted rhizomes are then broken into pieces keeping 2-3 sprouted eye buds on each rhizome. Each piece should be 2.5-5 cm long and 20-25 g in weight. The rhizomes are treated with bavistin @2g/litre of water for 30 minutes before planting.

Kineka Bijon bhal bisaribo aru dawai lagabo

Bimar aru poka nalagia bijon lobole lage. Bijon toh 2-3 suku

(eyes) rakhi kena katibole lage. Rupabo nimete aduwa toh 2.5-5 cm lamba aru 20-25 g bhari hobo lage. Bijon mati te nahala agote bavistin @2g/litre pani te milai kena 30 minutes bijai rakhi bhi.

Seed rate: 1800 kg/ha

Bijon kiman lage: 1800 kg/ha

Planting

Before sowing, 25 g powdered neem cake is mixed with soil. The rhizomes are planted during March-April at a depth of 7-10 cm and at a spacing of 25×30 cm.



Bijon rupabole

Bijon narupa agote 25g neem cake powder dhali kena mati lokot bhal para milai dibi. Bijon toh March-April mohina te 25×30 cm jaga chari kena, 7-19 cm mati bhitore te lagai.

Manuring

Ginger requires heavy manuring. Well-rotted cattle dung or compost @25-30 tonnes per hectare is applied at the time of planting. To each bed, 25 g powdered neem cake is applied and mixed together with the soil. NPK @ 60:50:50 kg/ha is applied at the time of planting and N @ 50 kg/ha at 45 DAP and @ 40 kg/ha at 120 DAP

Mol dibole niyom

Aduwa toh mol bishi lage. Aduwa laga time te bhal para sukhi ja guru mol nahoile ghas-patta puchia mol @ 25-30 tonnes/ha mati te milabo lage. Ekta ekta bed te bhal para khundi lua neem cake @ 25 g mati te milai kena dhalibo lage. NPK @ 60:50:50 kg/ha bijon dhalia time te mati te milabo lage. Nitrogen toh 50kg/ha 45 din pichete aru 40 kg/ha 120 din pichete mati te milai dibi.

Mulching

The crop is mulched immediately after planting with green leaves @ 12-15 t/ha. Mulching may be repeated at 40 and 90 days after planting.

Sukha patta para bon kori rakha

Bijon mati te hala pichete sukha patta @ 12-15 t/ha khan para bon koridibi. Patta khan para bon koridiya toh hodai 40 aru 90 din rupa pichete kori thakibo lage.

Weeding and irrigation

Weeding thrice at 60, 90 and 120 days after planting and irrigation about 15 to 23 irrigations depending upon the weather and the soil conditions

Nerani aru pani dibole niyom

Bijon dhalia pichete tin bar (3) nerani 60, 90 aru 120 din te koribo lage. mati aru din hisab para 15-23 bar pani dibole lage.

Plant-protection measures

Diseases: Rhizome rot, Leaf spot, Thread-blight

Management:

1. Select healthy diseased-free rhizome
2. Maintain proper drainage
3. Collect the infected plants and burn them
4. Intercrop with leguminous crops.



Rhizome rot

Bimar: Aduwa puchia, Pata te daki, Chamara khai dia aru sukha hui kena muri ja

Bimar kineka rukhabo:

1. Bimar nathakia aduwa bijon rupabo lage
2. Pani jabole nala thik thakibo lage
3. Bimar thakia ghas khan julai dibo lage
4. Aduwa toh leguminous crops logote pala-pali rupabo lage

Pests: Shoot borer, rhizome fly, white ant