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## To Promote the Conservation and Underutilized and Neglected Crop Guizotia Abyssinica (L.F.) Cass

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### ABSTRACT

Niger, scientifically known as *Guizotia abyssinica*, is an important secondary oilseed crop originating from Ethiopia and belonging to the Asteraceae family. Also known as ramtil or khurasani, it has gained prominence for its medicinal properties and oil-rich seeds. While Ethiopia is its place of origin, India has emerged as a leading producer. With its rich oil content of around 40%, primarily composed of linoleic acid, niger finds extensive use in edible oil production and traditional medicine. In India, it remains a staple in various rural and tribal areas. However, despite its significance, scientific exploration of its benefits has been limited. Niger is an annual herb, reaching up to 2 meters in height, with a well-developed taproot and hollow, hairy stems. Its bright yellow flowers produce small, glossy black seeds containing valuable fatty acids and proteins. Niger is cultivated in several countries worldwide, including Ethiopia, India, and Brazil. The crop has diverse uses, from edible oil extraction to medicinal applications. Its seeds are employed in treating ailments such as syphilis and coughs, while its oil is utilized for birth control. Its nutritional composition includes essential amino acids like arginine and aspartic acid, making it a valuable dietary supplement. Despite its potential, niger cultivation faces challenges such as limited genetic variation, susceptibility to diseases, and declining production areas. Efforts are underway to introduce advanced varieties with improved traits like disease resistance and higher oil content. In India, states like Madhya Pradesh, Maharashtra, and Odisha lead in niger cultivation, though production has seen fluctuations over the years. Initiatives are required to educate farmers on proper cultivation techniques, enhance research for advanced varieties, and address production challenges to unleash niger's full potential as a valuable oilseed crop.

**KEYWORDS:** *Niger, Guizotia abyssinica, oilseed crop, cultivation, medicinal properties, chemical composition, fatty acids, amino acids, production, varieties, intercropping, water management, fertilizer management, pest control, disease control, weed control, harvesting, financial balance, potential, research.*

### 1. INTRODUCTION

Niger is a secondary oilseed crop and its botanical name is *Guizotia abyssinica* (L.F.) Cass. Niger belongs to the family Asteraceae. Niger is also called ramtil, kalatil or khurasani. Ethiopia is the origin of four other species. Although niger is originally from Ethiopia, India is considered to be the leading country in the production of niger. Niger is an oily crop with medicinal properties and is used to treat various ailments and disease. In India, niger is still used as an edible oil not only in many tribal areas but also in remote rural areas. About 50% of the total oilseed production of Ethiopia and 03% of the production of niger is taken from India. *Guizotia abyssinica* (L.F.) Cass. is an indigenous medicinal and oil yielding plant of India and has never been studied scientifically for its beneficial effects. It is a dicotyledonous herb, moderately to well branched and grows up to 2m tall.

The seed contains about 40% oil with fatty acids composition of 75-80% linoleic acid, 7-8% palmitic and stearic acid, 5-8% oleic acid (Getinet and Tekelwold 1996). The Indian types contain 25% oleic acid and 55% linoleic acid (Nasirullah et al. 1982). Niger is grown as oilseed in Ethiopia, Germany, West Indies, Brazil, Mexico, China, Nepal, Bangladesh, Bhutan, Myanmar, and India.

## USES

Fibre than most oilseed meals. In Ethiopia, Niger seed is mainly cultivated for its edible oil. There are reports that Niger seed oil is used for birth control and for the treatment of syphilis (Belayneh,1991). Niger sprouts mixed with „garlic“ and „tej“ are used for the treatment of coughs. Niger seed can be used to treat the Rheumatoid.Niger seeds can be used as itching, swelling and inflammation, abscesses, boils, etc.

## CLASSIFICATION: -

Kingdom-Plantae  
Class- Equisetopsida  
Order- Asterales  
Family- Asteraceae  
Tribe- Heliantheae  
Genus- Guizotia  
Species- Guizotiaabyssinica

## BOTANICAL DESCRIPTION: -

Guizotiaabyssinica, also known as nigerseed, ramtil, or noog, is an erect, stout, branched annual herb native to the Ethiopian and Eritrean highlands. It is cultivated for its edible oil and seeds, and has become an important crop in many parts of the world.

**Habit:** Erect, stout, branched annual herb

**Height:** Up to 2 meters (6.6 feet) tall.

**Root system:** Well-developed taproot with many lateral roots, particularly concentrated in the upper 5 cm of soil.

**Stems:** Soft, hairy, hollow, and branched. Up to 2 cm in diameter. Pale green in color, often with purple stains or dots, turning yellow with age.

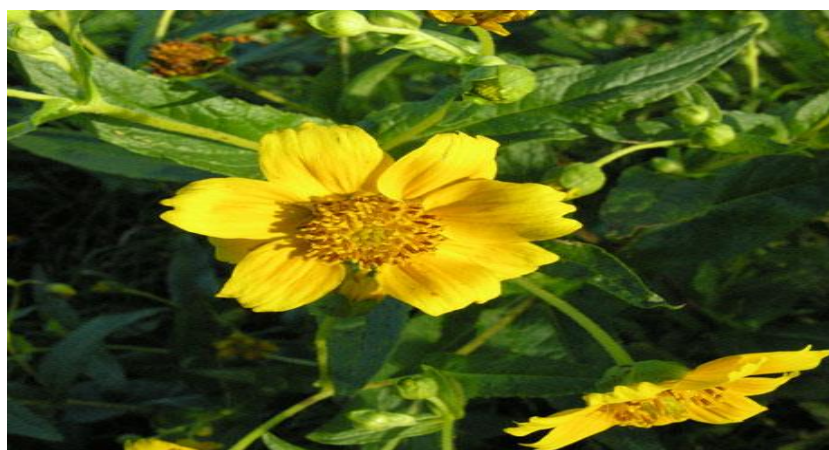
**Leaves:** Opposite, sometimes alternate at the top of the stems. Simple and sessile. Lanceolate to obovate in shape, 3-23 cm long and 1-6 cm wide. Variable in shape, with margins that are entire, toothed, or ciliate (fringed with hairs). Softly hairy on both surfaces. Usually dark green, but lower leaves can be distinctly yellow.

**Inflorescence:** Arranged in apical or axillary cymes surrounded by leafy bracts up to 3 cm long.

**Flowers:** Capitula (composite flowerheads) ranging from 15 to 50 mm in diameter. Bright yellow, maturing to golden yellow. Each flowerhead contains both ray florets (around the periphery) and central disc florets. Ray florets are typically absent or inconspicuous. Disc florets are numerous (more than 50 per flowerhead) and have five yellow lobes.

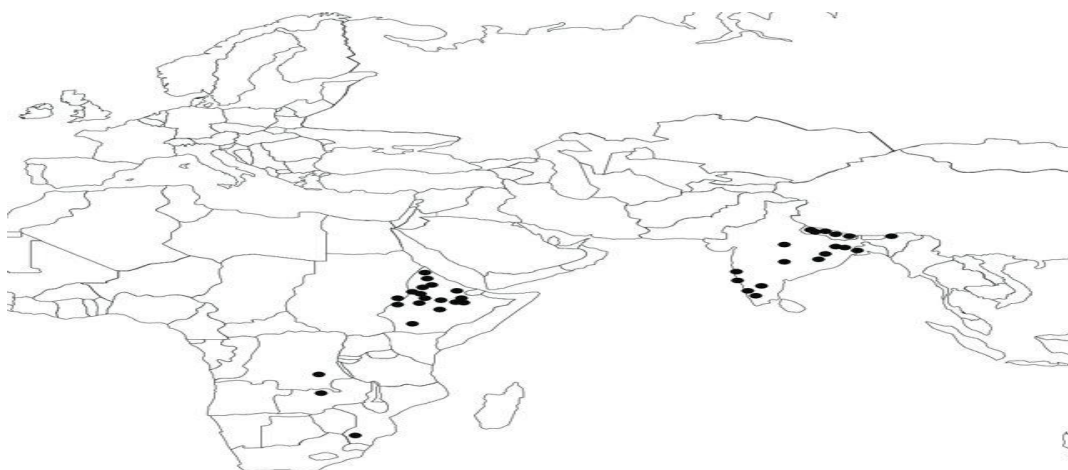
**Fruits:** Achenes (small, dry, single-seeded fruits) about 3-6 mm long and 1.5-4 mm wide. Glossy black in color. Each flowerhead produces about 50 seeds.

Guizotiaabyssinica is a short-day plant, meaning it flowers when the day length becomes shorter. It is not self-fertile and requires insect pollination for seed production. The plant is drought-tolerant and can grow in a variety of soil types, but prefers well-drained, moist soil.



**Photograph:1- Guizotiaabyssinica flower**

**Place of origin:** It is a secondary oilseed crop and is said to have originated in the tropical region of Africa (Baagoe,1974). It is mainly grown in some parts of the world Sudan, Uganda, Zanzibar, Tanzania, Malawi, Zimbabwe and West Indies, Nepal, Bangladesh, Bhutan, Pakistan (Weiss,1983). The genus *G.villosa* is mainly concentrated in the northern and southwestern of Ethiopia. The genus *G.zavattari* is found only in the mega mountain ranges of southern Ethiopia and in the Hurri hills of Northern Kenya. It is believed that, in the early 3rd millennium BCE, niger was brought to India by Ethiopian migrants along with crops like Nachani (Dogget,1987). It is important to note that they did not bring the wild variety here. India is the largest producer and exporter of niger (Chavan,1961). In India, Andhra Pradesh, Madhya Pradesh, Odisha, Maharashtra, Bihar, Karnataka, West Bengal are the major states where niger is widely grown. Of these, Madhya Pradesh is the largest producer state. Attempts were also made to produce niger in the world. These include Russia, Germany, Switzerland and France.



**Fig.1. Geographic distribution of Guizotia abyssinica**

## 2. CHEMICAL PROPERTIES

The seeds of niger crop contains 40% oil with fatty acids, 75-80% linoleic acid, 7-8% palmitic and stearic acid mixture and 5-8% oleic acid. (Getinet and Tekelwood, 1995). 30-50% of the oil is found in niger. Approximately 30% of the protein and 20% of the fibre is found in the flour left after the oil is extracted. A total of 17 types of amino acids are found in niger. It contains amino acids. Niger contains the highest amount of arginine amino acid. It is followed by aspartic acid.

<b>Fatty acid</b>	<b>Indian Niger</b>	<b>Ethiopian Niger</b>
Palmitic acid	8.2	8.2
Stearic acid	6.7	6.5
Oleic acid	28.4	6.5
Linoleic acid	56.0	76.6
Linolenic acid	-	0.6
Arachidic acid	0.6	0.5
Behenic acid	-	0.7

**Table:1- Average Fatty Acid in Indian and Ethiopian Niger (in%)**  
(Reference: Getinet & Sharma, 1996)

<b>Sr.no</b>	<b>Amino Acid</b>	<b>Acid Content</b>	<b>µg average protein(%)</b>
1.	Isoleucine	307	4.66
2.	Leucine	388	6.99
3.	Lysine	294	4.74
4.	Methionine	109	2.06
5.	Cistin	177	1.40
6.	Phenyl alanine	327	4.80
7.	Tyrosine	185	-
8.	Threonine	237	3.73
9.	Tryptophan	54	-
10.	Valin	362	5.76
11.	Arginine	621	9.36
12.	Histidine	162	-
13.	Alanine	281	4.06
14.	Aspartic acid	619	9.49
15.	Glycine	375	5.53
16.	Prolin	262	3.86
17.	Serin	347	6.19

**Table:2-Major amino acid, amino acid and protein found in niger (Reference-Getinet & Sharma, 1996)**

### 3. AREA AND PRODUCTION

#### AREA-

Nigers are grown in many countries of the world. These include Ethiopia, India, Germany, West Indies , Brazil, Mexico,China, Nepa, Myanmar,Russia, Germany, France and Switzerland also produce small quantities of niger.Madhyapradesh has the largest area under niger in India. In Madhya pradesh, 0.66 lakh hectare area is under niger cultivation.

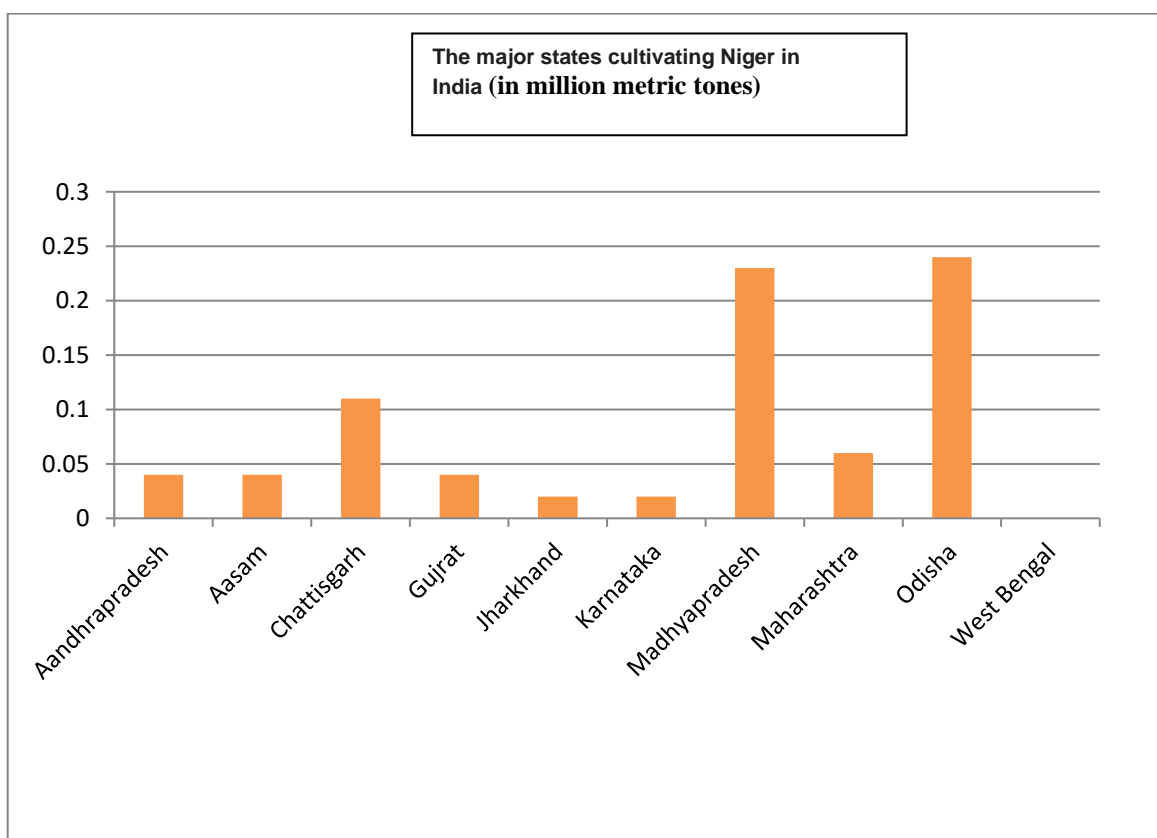
It is followed by Chhattisgarh with 0.63 lakh hectares and Maharashtra with 0.23 lakh hectares Among the areas under niger cultivation, Jharkhand has the lowest area under cultivation at 0.03 lakh hectares considering India. Maharashtra is also leading state in niger production. Kolhapur, Oosmanabad, Nagpur, Satara, Solapur, Pune, Jalgaon, Ahmednagar, Dhule, Sangali, Aurangabad, Parbhani, Nanded etc. In Maharashtra mainly produces niger. Ahmednagar and Aurangabad districts are known as the leading districts in niger cultivation. 2012-13 to 2016-17,0.25 lakh hectare area was under niger cultivation in Maharashtra. In the year 2017-18 this area decreased to 0.18 lakh hectare. The data obtained shows that the niger cultivation is declining day by day.

Sr.no	State	(lakhs in hectare)	ction (lakhs metric tones)	ome (quintal per hectare)
1.	Aandhrapradesh	0.06	0.04	4.78
2.	Aasam	0.07	0.04	5.95
3.	Chattisgarh	0.63	0.11	1.74
4.	Gujrat	0.10	0.04	5.21
5.	Jharkhand	0.03	0.02	5.90
6.	Karnataka	0.10	0.02	3.08
7.	Madhyapradesh	0.66	0.23	3.55
8.	Maharashtra	0.23	0.06	2.42
9.	Odisha	0.66	0.24	3.58
10.	West Bengal	0.04	0.03	7.13
	Total	2.61	0.84	3.21

**Table:3- Area, Production& Income of Major Niger Producing State In India**

#### PRODUCTION

In the green revolution period, the cropping pattern improved rapidly. During this period, Nashik, Sangali and Aurangabad districts became the major centers of niger production in Maharashtra. During the period 2012-13 to 2016-17, Maharashtra produced a total of 37.19 lakh tones of oilseed. Out of this, 0.06 lakh tones was produced by niger alone. In the year 2017-2018, 41.62 lakh tones of oilseed were produced. Out of this, only 0.05 lakh tones belonged to niger. During the year 2018-19, the total production of oilseed increased to 46.24 lakh tones. But there was no significant increase in production. the share of niger in the total production of oilseeds during the year 2018-2019 was 0.05 lakh tonnes.. The dwindling area dedicated to niger cultivation and its subsequent decline in production raise serious concerns.. For this, the government needs to take steps to increase its production.



**Table.4. Average production of Niger in Major States of India (In lakh metric tons)**

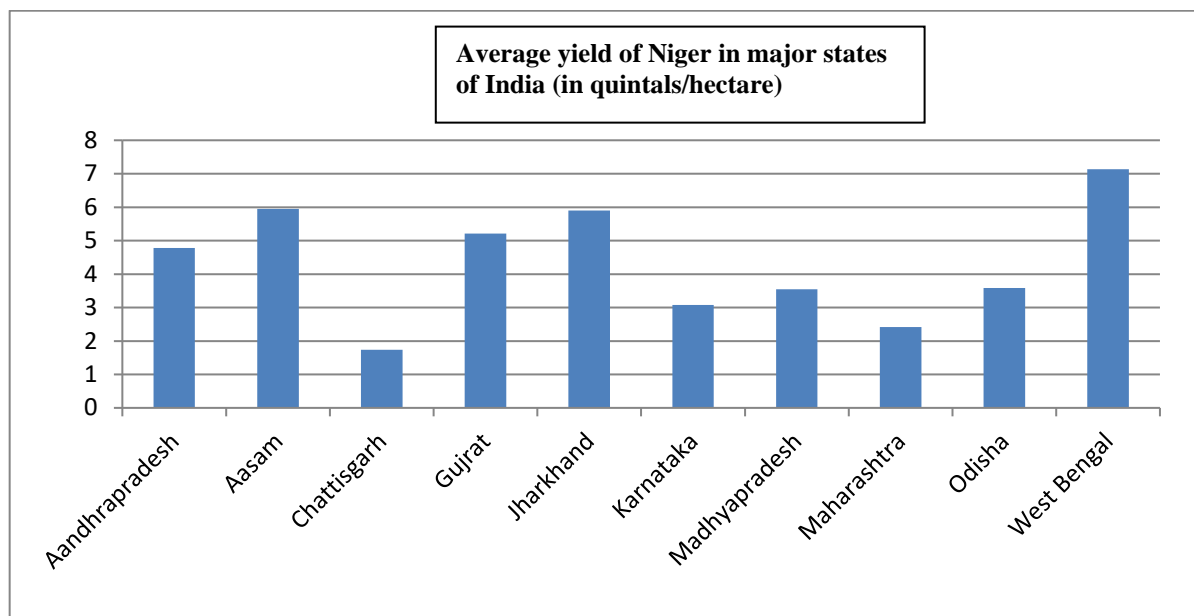


Table.5. Average Niger Yield (in quintals/hectare) in major Indian state

### Local, Advanced and Hybrid varieties

Limited genetic variation in niger restricts the development of hybrid varieties, unlike cereal crops with a wider gene pool. (This emphasizes the impact of limited diversity on hybrid development).

From 2002 to 2016, a total of 13 new varieties were introduced in the market. **JNC-6, JNC-9, UTKAL NIGER-150** and **BNS 10** are some of the advanced breeds of crop.

### Advanced variety

**A] Ootacamund:-** This is very high quality variety of niger developed by ICR organization. This variety takes a 100 days to complete its lifespan. The crop is harvested in 100-110 days. **This improved variety holds the potential to deliver 500kg of yield per hectare.** The characteristics of this variety are that the seeds of this variety are found to be sensitive to temperature.

**B] R.C.R.317:-** This variety takes 90-100 days to complete its lifespan. This variety yields faster than any other variety. It is possible to produce 500kg per hectare from this improved variety. The characteristics of this variety are sensitive to temperature and the seeds are found to be thick.

**C] Phulevaitarna:-** This variety takes a 100 days to complete its lifespan. It is possible to produce 500kg per hectare from this improved variety. The characteristics of this variety is that the seeds are found in a bright black colour.

**D] Phuleniger:-** This variety takes 100 days to complete its lifespan. **This improved variety holds the potential to deliver 500kg of yield per hectare.** The characteristics of this variety is that it is a variety that responds to chemical fertilizer.

State	Reformed race
Madhyapradesh/Chattisgarh	JNC-6,JNC-1,JNC-9
Maharashtra	IGP-76,IGPN-2004-1(niger flower-1)
Karnataka	RCR-317,RCR-18,KBN-1
Odisha	GA-10, Utkal Niger-150
Jharkhand	Birsa Niger-1, Birsa Niger-2,BNC-10
Gujrat	Gujrat Niger-1,NRS-96-1
Tamilnadu	Paitur-1

**Table:6-Major States Cultivating Niger in India and Developed Varieties**

Improved speech	Maturity (in days)	Income (kg/ha)	Oil content (%)	Recommended state
Ootacamund	110	500	43	Madhyapradesh,Bihar
N-5	95-110	450	40	Madhyapradesh,Bihar
IGP-76	105	470	40	Karnataka,Odisha Gujrat, Rajsthan W.Bengal,Maharashtra
No.12-3	110	450	40	Maharashtra
No.71	95	475	42	Aandhrapradesh, Tamilnadu, Karnataka, North-east highlands
Gaudaguda	95	570	39	Aandhrapradesh
Phulbanil	95-110	400	40	Odisha
RCR-317	90	500	40	All over in India especially Gujrat
GA-5	120-125	400	39	Odisha,Bihar, W.Bengal, Karnataka
GA-10	115-120	450	42	Odisha,Bihar, W.Bengal, Karnataka

**Table:7-Improved speech,there main features & the state recommended for plantation by ICAR.**



**Photo no.2.Phulekarla(advanced Varieties)**

#### **Seed processing and germination methods**

The diminutive size of niger seeds, coupled with the misconception of the crop's unimportance, leads many farmers to forego seed treatment, making them susceptible to a variety of diseases. The disease is transmitted to the crop by fungi from seeds or soil particles. According to reasearch, it has been proved that the crop dies due to non-processing of seeds before sowing. As a result, it has adversely affected crop yields and yields as well as acreage has declined. 1kg of niger seeds should be treated with three grams of chemical fungicide carbendazim to control the disease. It is beneficial to use of 15kgof carbendazim per hectare for seed treatment. Carbendazim is chemical fungicide. It can be used to prevent the death of disease. Atmospheric nitrogen seeds are often reduced due to adverse weather conditions. Inadequate levels of nitrogen can have an adverse effect on crop growth.

To absorb such nitrogen in the atmospheric, rub 25gms of Azospirillum per kg of niger seeds. It is difficult to absorb nutrients that are not found in soluble form. Phosphorus nutrients are often not found in a soluble state, so they are not available to the crop in adequate quantities. Seed treatment of 25g of bacteriacide per kg of seed to bring similar phosphorus nutrients in the soil.

The seeds should be sown in properly cultivated soil within 4hrs after good drying. Doing so helps the crop to meet the soluble phosphorus. If farmers who are deficient in chemical fungicides rub thyrum seeds at the rate of 3gm per kg. The crop can be protected from fungal disease.

### Planting season

In India, niger is usually sown from mid-june to the 1st week of August for the kharif season. Niger is sown in September for the semi-rabbi season and in December for the rabbi season. In a diverse country like India, the duration of sowing varies from state to state.

### Planting

Due to the small size of nigerseeds, the rate of seed required for sowing can be more or less per hectare. In Ethiopia, it takes 5-10k per hectare for factory sowing. In India, the same rate is found to be 5-8kg per hectare. Rare sowing of niger helps in increasing the number of branches and the number of flowers forming on it. The result is increased production

Years	area (lakhs in hectare)	(lakhs in metric tones)	(quintal per hectare)
2008-09	0.38	0.10	271
2009-10	0.33	0.07	215
2010-11	0.35	0.08	220
2011-12	0.37	0.12	312
2012-13	0.40	0.12	301
2013-14	0.40	0.13	321
2014-15	0.16	0.03	177
2015-16	0.12	0.02	148
2016-17	0.14	0.02	165
2017-18	0.18	0.04	251

**Table:8-Review of Niger in the state of Maharashtra**

### Intercropping

Special care of the crop is required after sowing of the crop. After sowing the seeds in the right way during the planting season, it is necessary to do intercropping in the right way at the right time. Just as pre-cultivation is necessary as well as intercropping is necessary. Because, the seeds of this crop are very small in size. There are more probability of more seeds falling in one place while sowing. Therefore, the number of seedlings is higher in one place. At such times the seedlings do not grow fast. So, when sowing make sure that the seeds do not fall in one place.

## 4. WATER MANAGEMENT

Niger is mainly grown during the kharif season. Kharif crops generally depends on rainfall. The water required for this crop is available through rains. For this reason, students do not have to worry about watering the niger. In areas where the rainfall is moderate as well as the annual rainfall is 1000 to 1250 mm, it grows vigorously. Irrigation is required only if the rains are prolong.

If the rainfall is not satisfactory, it is possible to irrigate the niger in the tradition way. When the plant is mature, apply a little water stress to the crop before flowering. Water after straining. By doing this, the niger grows good flowers. However, watering should be stopped after the process of filling the flowers.

During rabbi season, however, special attention needs to be paid to watering. The water should be released after a certain period of time till the seedlings mature. Special care should be taken to ensure that the crop does not face high water stress after march during the half rabbi season. If water stress is high, it has an adverse effect on the crop. As a result, production is likely to decline.

## 5. FERTILIZER MANAGEMENT

Compared to all other crops, niger is very good in fertilized management. It can be taken very well even in normal light soil. This is because this crop requires very little fertilizers a compared to other crops. Mainly in the ground mix cow dung. Niger grows vigorously in the right amount of compost. Niger is less sensitive to nitrogen as well as phosphorus. Niger crop should be supplied with 20kg N/ha and phosphorus should be 20kg/ha.

In India, both nitrogen and phosphorus are given to cow dung along with cow dung. In different states of India, the quantity of fertilizers applied depending on the type of soil is also found to be more or less. In Madhya pradesh, 10kg N and 20kg P per hectare are given at the time of sowing. At 35 days after sowing, it is necessary to apply 10kg P/ha. In Odisha 20kg N/ha, 40kg P/ha is required at the time of sowing. After 30 days it is necessary to apply 20kg N.

In Maharashtra, mainly 4 tonnes of manure and 20kg N per hectare is given to the niger crop. In Aandhra pradesh it is beneficial to apply 10kg N/ha at the time of sowing along with 5 tonnes of manure. The following table shows the amount of fertilizers required for the niger crop in the major states of India.

## 6. INSECT CONTROL-

- 1) Early pests should be uprooted and destroyed.
- 2) Egg larvae and cocoons of leaf insects should be collected and destroyed.
- 3) Insects infested part of the plant should be removed.
- 4) Insects should be caught and destroyed using tools like cage trap etc.
- 5) Electric fences, electromagnetic devices, attracting insects with the help of light, they should be destroyed with the help of rays.
- 6) Spray pesticides with the advice of Agricultural experts.

## 7. DISEASE CONTROL

- 1) Early diseased plants should be uprooted.
- 2) Dig a deep it away from the field and bury the diseased plant.
- 3) The diseased part of the plant should be removed.
- 4) Spray pesticides on niger with the advise of agronomists.
- 5) Spray fungicide with proper advise.
- 6) when buying fungicides, know their duration and Method of use.

## 8. WEED CONTROL

- 1) Seeds to be used for sowing should be weeds free.
- 2) Weeds should not be allowed to grow near water ditches, field dams or ashes, compost pits etc. If they grow, they should be uprooted before flowering.
- 3) Use fully decomposed manure or compost.
- 4) Weeds grown before sowing should be removed separately.
- 5) Preferably intercrop should be used.
- 6) Use herbicides recommended for crops in given doses.
- 7) Expired herbicide should not be used.

## 9. HARVESTING, HANDLING AND PROCESSING

In general, the niger complete its life cycle in 3 to 3.5 months. The niger is harvested in about 100-110 days after sowing. Assume that the crop is ready for harvest after the upper part of the carp turns black. Collect niger crop with the help of a weeder or uproot. When the niger is ripe, the seeds in the carp become loose. Therefore, it is necessary to handle the weeds carefully during harvesting.

When the niger is harvested in a rough manner, the niger is likely to break off and fall to the ground. Therefore, it is important to harvest the niger crop at the right time. Immediately after harvesting, all the crops should be brought to the ditch. After collecting all the crop on the threshing floor, let it dry properly for 2-3 days. This makes it easier to separate the seeds from the carp properly.

Helps to reduce unnecessary excess moisture in the crop after drying. Low humidity helps in reducing the incidence of fungus on the seed. After two or three days of proper drying, the niger should be beaten with a stick and freed from the seed carp. The yield varies from 2-2.5 quintals per hectare depending on the variety.

## 10. FINANCIAL BALANCE OF NIGER CROP (ARABLE AREA):

Farmers need to draw a financial balance sheet before planting or harvesting any crop. Having a financial balance sheet helps the farmer to understand whether he has made a profit or a loss from a particular crop. It is also possible to use the financial balance sheet to track how much was spent on which component. When planting the same crop next year, you can plan by looking at the balance sheet of the previous year.

If there was an unnecessary expenditure on an element last year, it helps to bring it under control next year. Therefore, it is necessary to draw a financial balance sheet of the crop. From the following tables you can see the financial balance sheet of niger crop.

Sr.no	Details	Rupees
1	A)pre-cultivation of land	
	1.Plowing	800
	2.Two shifts	400
	3.Manure	1000
	Total	2200
2	B) Seed sowing	
	1.Seed processing	110
	2.Sowing costs	300
	3.Chemical manure	200
	4.Intercrop planting costs	1400
	Total	2010



3	C) Intercropping 1. Weeding 2. Weed control 3. Insect control 4. Irrigation cost 5. Fertilizers Total	900 140 220 000 110 1370
4	D) Harvesting and sale of crop 1. Harvesting of crops 2. Transportation cost 3. Aadhar expences Total Total capital expenditure=	250 600 265 1115 6695

**Table:-9. Base prices of major oilseeds**

## 11. RESULT AND DISCUSSION

Niger: A Potential Oilseed Crop Deserving More Attention.

Despite its global significance and multiple uses, Niger, a minor oilseed crop in India, suffers from limited farmer knowledge and under-developed cultivation practices. While its production sits around 2 lakh tonnes and exports reach 3000ml, its potential is far greater. Researchers have identified a critical need to bridge the knowledge gap by effectively communicating improved cultivation techniques to farmers in a clear and accessible manner. This, coupled with targeted research efforts, can unlock Niger's true potential.

Untapped Potential: Niger boasts a high oil content (around 40%) with valuable fatty acid composition. However, its poor keeping quality due to high unsaturated fatty acid content hinders its wider use.

Traditional Yet Under-Researched: Originating in Ethiopia, Niger has been cultivated for millennia globally. Despite its historical significance, it lacks the level of research and development dedicated to other major oilseed crops.

Need for Advanced Varieties: To address challenges faced by farmers, research efforts should focus on developing varieties that are:

Less rain-dependent: This would improve adaptability and reduce reliance on unpredictable weather patterns.

Insect and disease resistant: This would minimize crop losses and ensure higher yields.

Boasting higher oil content: This would enhance the overall economic viability of the crop.

## REFERENCES

- [1]. Abebe, D. 1992. Ethiopia's oilseed genetic resources. Pp. 13-23 in Oilseed Research and Development in Ethiopia. Proceedings of The First National Oilseed Workshop, 3-5 December 1991,
- [2]. Addis Abeba. Baagøe, J. 1974. The genus *Guizotia* (Compositae). A taxonomic revision. Bot. Tidsskrift. 69: 1-39.
- [3]. Belayneh, H. 1986. Source-sink study on niger. Oil Crops Newsl. 3: 63- 65.
- [4]. Chavan, V.M. 1961. Niger and Safflower. Indian Central Oilseeds Committee, Hyderabad.
- [5]. Dagne K 2001. Cytogenetics of new *Guizotia* Cass. (Compositae), interspecific hybrids pertaining to genomic and phylogenetic affinities. Plant Systematics and Evolution, 230: 1-11
- [6]. Dwivedi et al., (1995) 83 Effect of water stress on growth performance, phenological behaviour and yield of niger (*Guizotia abyssinica* Cass: Compositae).
- [7]. Genet, T. 1994. Phenotypic variation in the Ethiopian niger (*Guizotia abyssinica* Cass.) germplasm. MSc thesis. Alemaya University of Agriculture.
- [8]. Getinet A and Sharma S M 1996. Niger, *Guizotia abyssinica* (L.f.) Cass. Promoting the conservation and use of underutilized and neglected crops. Institute of Plant Genetics and Crop Plant Research. International Plant Genetic Resources Institute, Rome.
- [9]. Kivadasannavar et al., (2007) 86 Effect of sowing time, spacing and fungicidal spray on crop growth and seed yield of Niger (*Guizotia abyssinica* Cass.).
- [10]. Mohanty, R.N. 1964. Seed setting of niger under controlled environmental conditions. Indian Oilseeds J. 8:158.
- [11]. M.N. Krishnamurthy, K.V. Nagaraja and O.P. Kapur. 1982. Studies on niger seed oil 102
- [12]. Seegeler, C. J. P. 1983. Oil plants in Ethiopia. Their taxonomy and agricultural significance. Centre for Agricultural Publication and Documentation, PUDDOC, Wageningen.
- [13]. Sharma, S.M. 1990a. Niger seed in India: Present status of cultivation, research achievements and strategies. Pp. 159-165 in Proceedings of the three meetings held at Pantnagar and Hyderabad India, 4-7 January 1989 (A. Omran, ed.). IDRC-MR 252e.
- [14]. Victoria Grace Benelli. Comparison of Seed Yield, Oil and Phenotypic Traits Among Selected Parents and Crosses of Niger .
- [15]. Dr. Kadam PK 2017 khursani production technology.
- [16]. Major falling puppets in Maharashtra-internet.
- [17]. ycmou.digitaluniversity.ac
- [18]. krc.bamudigital.ac.in
- [19]. www.agrowon.com
- [20]. kvk.icar.gov.in103.