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# Calender of Operations

## BLACK PEPPER



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हर कदम, हर उभार  
किसानों का हमसाफर  
भारतीय कृषि जलुसंघान परिसर:  
*Agri search with a human touch*





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### Published by

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ICAR - Indian Institute of Spices Research  
Kozhikode, Kerala, India

### Citation

Dr. C.K Thankamani, V. Srinivasan, K. Kandiannan, R. Praveena (Eds. 2018) Calendar of Operations for Black Pepper, ICAR - Indian Institute of Spices Research, Kozhikode, Kerala, India.

### March 2018

Financed by: ICAR-Indian Institute of Spices Research, Kozhikode

No: of Copies 1000

Cover Design: Sudakaran A

### Printed at

KT Printers, Mukkom

## Calendar of Operations for Black Pepper

### January

#### Nursery

- ❖ Initial preparations for production of rooted cuttings.
- ❖ Prepare the potting mixture with fertile soil, farmyard manure and sand/ decomposed coir compost in 2:1:1 ratio and keep for solarization in an open yard for 30 to 45 days.
- ❖ Mix biocontrol agents with the potting mixture (*Trichoderma harzianum* and *Pochonia chlamydosporia* 1-2 g each per kg mixture).
- ❖ Fill the potting mixture (sand: soil: FYM in 2:1:1 ratio) in poly bags of 15 x 10 cm size. Make adequate holes on the polybag.
- ❖ Detach the marked and coiled runner shoots from the mother plant with sharp knife.
- ❖ Cut the detached runner shoots into 2 to 3 noded cuttings; remove the attached leaves leaving a small portion along with petiole on the stem.
- ❖ Rooted three node cuttings from existing nursery (3 nos) can be used for propagation using serpentine method.

#### Field

- Harvest matured berries when one or two berries in the spikes starts turning yellow or yellowish red.
- Berries can be separated from spikes using machine or other methods.
- Take cleaned berries in a vessel having drain holes or cloth and steep in

	<p>boiling water for one minute.</p> <ul style="list-style-type: none"> <li>• Sundry cleaned berries on clean cement floor/bamboo mat/paper/polyethylene/silpaulin sheet for 3-5 days (moisture 8-10 %).</li> <li>• Pack the dried and cleaned berries in polythene lined jute sack.</li> <li>• Heap the bags preferably over wooden floor after spreading polypropylene sheet, away from side wall.</li> <li>• Weeding the interspaces by slashing.</li> <li>• Mulch the basins with dry leaves or similar materials to conserve moisture. Green leaves may be used for mulching @ 5-10 kg per vine.</li> <li>• Remove hanging shoots from older plants.</li> <li>• Young vines should be tied to the support tree with jute thread.</li> <li>• Cover the young vines with dried or plated coconut leaves so as to prevent drying.</li> <li>• Remove and destroy plants showing symptoms of phyllody and viral diseases.</li> </ul>
<b>February</b>	<p><b>Nursery</b></p> <ul style="list-style-type: none"> <li>• Solarised potting mixture fortified with biocontrol agents may be used for filling the bags.</li> <li>• Runner vines can be detached from the mother plants and used for propagation.</li> <li>• Three noded cuttings (3 nos) may be used for planting in bags of 15 x 10 cm size.</li> <li>• Serpentine method for producing rooted cuttings may be continued.</li> </ul>

	<ul style="list-style-type: none"> <li>❖ Remove the already sprouted cuttings from the mist chamber and keep in shade.</li> <li>❖ Irrigate the plants at regular intervals to maintain low temperature and high humidity.</li> <li>❖ In case of mealybug infestation, spray and drench the rooted plants with chlorpyrifos (0.075%).</li> <li>❖ Spray carbendazim - mancozeb, if anthracnose incidence is noticed in the nursery.</li> </ul> <p><b>Field</b></p> <ul style="list-style-type: none"> <li>• Collect cuttings of standards like Murikku (<i>Erythrina indica</i>), Karayam or Kilingil (<i>Garuga pinnata</i>) and keep in shade for new planting.</li> <li>• Irrigate the young vines (4 litres) of water daily till commencement of monsoon</li> <li>• Irrigate mature vines (50-60 litres of water) once in a week depending on availability of water.</li> <li>• Care should be taken to avoid injuries to the roots while performing intercultural operations to prevent infection.</li> </ul>
<b>March</b>	<p><b>Nursery</b></p> <ul style="list-style-type: none"> <li>❖ Continue watering the plants at regular intervals to maintain low temperature and high humidity.</li> <li>❖ Spray Bordeaux mixture (1%) and drench copper Oxchloride (0.2%) as a prophylactic measure against foot rot disease.</li> </ul>

	<ul style="list-style-type: none"> <li>❖ In case of leaf gall thrips or scale insect infestation, spray dimethoate (0.05%). In case of mealybug's infestation, spray and drench the rooted plants with chlorpyrifos (0.075).</li> </ul> <p><b>Field</b></p> <ul style="list-style-type: none"> <li>❖ If scale insect infestation is observed, spray the vines with dimethoate (0.05%).</li> </ul>
<b>April</b>	<p><b>Nursery</b></p> <ul style="list-style-type: none"> <li>❖ Continue irrigating the plants at regular intervals to maintain low temperature and high humidity.</li> </ul> <p><b>Field</b></p> <ul style="list-style-type: none"> <li>• Plant cuttings of Murikku, Karayam, Kilingil or Glyricidia of 2 meter length at a spacing 3 x 3 meter with the receipt of summer showers.</li> <li>❖ Irrigate the plants at regular intervals to maintain low temperature and high humidity depending on availability of water.</li> <li>❖ Apply dolomite @500 g per vine after receiving rain if not applied during previous month.</li> <li>❖ Spray micronutrient mixture for vigorous growth.</li> <li>❖ Regulate shade by pruning branches of standards (support trees).</li> </ul>
<b>May</b>	<p><b>Nursery</b></p> <ul style="list-style-type: none"> <li>• Daily irrigation may be given.</li> <li>• Spray Bordeaux mixture (1%) and drench copper oxychloride (0.2%) as a prophylactic measure against diseases.</li> <li>• If mealybug infestation is noticed,</li> </ul>

	<p>drench the bags with chlorpyrifos (0.075%).</p> <ul style="list-style-type: none"> <li>• If gall thrips or scale insect incidence is noticed, spray dimethoate (0.05%). Remove pest/disease affected bags, select healthy, robust rooted cuttings for field planting/ replanting.</li> </ul> <p><b>Field</b></p> <ul style="list-style-type: none"> <li>• Prepare pits (50 x 50 x 50 cm) on northern side of the standards, 15-30 cm away from base of the standard. Fill the pits with mixture of topsoil and FYM or compost @ 5 kg/pit mixed with biocontrol agents viz., <i>T. harzianum</i> (50 g/pit) and <i>P.chlamydozporia</i> (50 g/pit).</li> <li>• Tie and trail the growing shoots to the standards.</li> <li>• Provide shade to the plants, if the land is exposed. Shade can be removed after receiving 1 or 2 showers.</li> <li>• Remove and destroy all infected or dead vines along with the root system.</li> <li>• Prune the runner shoots or tie back to the standards before the onset of monsoon.</li> <li>• Irrigate the plants at regular intervals to maintain low temperature and high humidity depending on water availability.</li> <li>• Prune the branches of standards, if pruning was not done during April.</li> </ul>
<b>June-July</b>	<p><b>Field</b></p> <ul style="list-style-type: none"> <li>• If soil pH is &lt;5, apply dolomite 500 g to 1000 g/ plant.</li> <li>• Plant 2-3 rooted cuttings in the pits at a</li> </ul>

	<p>distance of about 30 cm away from the standards after receiving sufficient rain.</p> <ul style="list-style-type: none"> <li>• Press the soil around the cuttings to form a small mound sloping outwards and away from the cuttings to prevent water stagnation around the plants.</li> <li>• Undertake frequent inspection of recently planted vines for pest/disease infestations and take necessary protection measures.</li> <li>• Provide adequate drainage in areas prone to water stagnation.</li> <li>• Tie the growing shoots of young vines to the standard.</li> <li>• Undertake slash weeding in the interspaces.</li> <li>• Apply organic manures @ 10 kg/vine and neem cake @ 1 kg/ mature vine fortified with <i>Trichoderma</i> and <i>Pochonia</i> with the receipt of monsoon showers (vines more than 3 years of age).</li> <li>• Apply <i>Azospirillum</i> (50 g/vine).</li> <li>• Apply half the quantity/dose of (NPK50:50:150 g/vine/year as general recommendation i.e Urea 55 g; Rock Phosphate 140 g; muriate of potash 125g) per plant of more than 3 years old and care should be taken to avoid injuries to the vines/roots while applying fertilizers and other intercultural operations.</li> <li>• Apply 1 kg neem cake, 200 g rock phosphate, 0.5 kg ash and 10 kg cow dung per vine, if organic system is</li> </ul>
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	<p>followed. Apply 150 g sulphate of potash, if potassium deficiency persists in soil.</p> <ul style="list-style-type: none"> <li>• Spray black pepper micronutrient mixture @ 5 gm per liter water.</li> <li>• Undertake foliar spray with Bordeaux mixture 1% followed by soil drenching over a radius of 45-50 cm around the vines with copper oxychloride (0.2%) (@ 2-5 litres per vine), immediately after first monsoon showers, if <i>Phytophthora</i> incidence is noticed.</li> </ul> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>• Drench the soil and spray foliage with <i>potassium phosphonate</i> (0.3%) or <i>metalaxyl-mancozeb</i> (0.125%)(@ 2-5 litres per vine).</li> <li>• Undertake foliar spray with <i>quinalphos</i> (0.05%) to check pollu beetle or top shoot borer. Leaf gall thrips can be controlled by spraying <i>dimethoate</i> (0.05%).</li> <li>• Apply first round of biocontrol agents (<i>Trichoderma</i> and <i>Pochonia chlamydosporia</i>) along with organic matter/manures.</li> <li>• Avoid drenching of chemical pesticides, if biocontrol agents are applied.</li> <li>• Seedlings of silver oak and <i>Ailanthus</i> may be planted as support for black pepper.</li> </ul>
<b>August – September</b>	<p><b>Field</b></p> <ul style="list-style-type: none"> <li>• Continue new planting /replanting.</li> <li>• Undertake slash weeding.</li> <li>• Provide adequate drainage in the field.</li> </ul>



	<ul style="list-style-type: none"> <li>• Tie the growing shoots of young plants to the standards.</li> <li>• Prune the branches of support trees to regulate shade.</li> <li>• Apply balanced half dose of recommended fertilizers (Urea-55g: Rock phosphate-140g: Muriate of potash 125g) in the last week of August or first week of September.</li> <li>• Apply second round of biocontrol agents (<i>Trichoderma</i> and <i>Pochonia chlamydosporia</i>) along with organic matter/manures.</li> <li>• Apply <i>Azospirillum</i> (50 g/vine) along with 2 kg of vermicompost or well decomposed cowdung in organic production system. Sulphate of potash (150 g) can be added, if potassium deficiency persists in soil.</li> <li>• Care should be taken to avoid injuries to the vines while performing intercultural operations.</li> <li>• Spray the foliage with Bordeaux mixture (1%) and drench basin of the vines with copper oxychloride (0.2%) @ of 2-5 litres/vine, if foot rot symptoms are observed.</li> </ul> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> <li>• Spray foliage and drench the soil with potassium phosphonate (0.3%) or metalaxyl-mancozeb (0.125%) (@ 2-5 litres per vine).</li> <li>• Undertake foliar spray with quinalphos (0.05%) to control pollu beetle and top shoot borer.</li> <li>• Spray black pepper micronutrient mixture @ 5g per litre water.</li> </ul>
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<b>October</b>	<ul style="list-style-type: none"> <li>• If monsoon is prolonged, drench basins of the vines with potassium Phosphonate (3ml/litre) @ 2-5 litres per vine, depending on size of the vine.</li> </ul>
<b>November-December</b>	<p><b>Nursery</b></p> <ul style="list-style-type: none"> <li>• After evaluation, select and label mother vines of high yielding varieties tolerant to biotic and abiotic stresses (5-12 years old).</li> <li>• Runner shoots from selected mother vines may be coiled and tied on a stake to prevent soil born infection and striking roots in the soil.</li> </ul> <p><b>Field</b></p> <ul style="list-style-type: none"> <li>• Tie the growing shoots of young vines to the standards.</li> <li>• Young vines to be covered with dry arecanut or coconut leaves/fronds.</li> <li>• Mulch the basins with green leaves @ 10 kg per plant.</li> <li>• Remove hanging shoots from older plants.</li> <li>• Destroy plants showing symptoms of phyllody and virus diseases.</li> <li>• In case of root mealy bugs infestation, drench the affected vines with chlorpyrifos (0.075%) and repeat drenching after 21 days.</li> <li>• In case of scale insect infestation, spray neem oil (0.3%) or neem based insecticides (0.3%) or dimethoate (0.1%) and repeat the sprays after 15 days.</li> </ul>