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Broccoli - Introduction



Broccoli is a cool-season crop that, like spinach, can be grown in the spring and autumn. Broccoli is a member of the cabbage family. Broccoli heads are rich in vitamins and minerals.

Broccoli: Testing the learning: Introduction

- Broccoli is family to the cabbage? Yes/No
- Register to grow your crop on the U Can Grow app? Yes/No



Broccoli – Planting and Spacing

- Broccoli can germinate in soil with temperature as low as 5C
- Broccoli requires full sun and moist, fertile soil that's slightly acidic. Work in 5 to 10cm of rich compost or thin layer of manure before planting.
- Plant transplants that are 4 to 6 weeks old with four or five true leaves.
- Leggy transplants or transplants with crooked stems can be planted up to their first leaves so that they will not grow top-heavy.
- Plant seedlings 45cm to 61cm apart in rows 61cm to 91cm apart on each high bed of 90cm to 100cm wide.
- The seedling must be sufficiently watered several hours before transplanting to make it easier to remove the plant from the seedling bed. Thus, the roots of seedling may hold as much soil as possible, do as to prevent wilting during transplanting.
- Plant seeds and transplants at the same time for succession crops or plant early and midseason varieties at the same time.
- Sow seed 1.2cm deep and 7.6cm apart.
- Transplant thinned seedlings to another part of the garden.
- Watering must apply immediately after the transplanting.
- Keep soil moist during the growing season.
- Decrease watering when plants approach maturity.
- Water broccoli at the base of the plant.
- Side dress plants with well-aged compost at planting time and again at midseason.

Broccoli: Testing the learning: Planting and Spacing

- Sow seed 1.2cm deep and 7.6cm apart. True/False
- Have you grown the crop before? Yes/No



Broccoli – Compost and mulching

A soil analysis should be done. Broccoli is a medium to heavy feeder. Broccoli thrives best on the soil of good fertility.

Following are the applications in broccoli farming:

- a. 1st application: Should be applied in a circle around the plants after it recovered from the transplanting.
- b. 2nd application: Should be applied in bands on shoulders of the bed 2 weeks after 1st side dressing.
- c. 3rd application: Should be applied on both sides of the furrows when the flower buds start to form.

How to apply the Fertilizer:

- 1) Spread vegetable fertilizer in your broccoli gardening bed, distributing the fertilizer across the soil surface seven days before you are scheduled to plant your broccoli.
- 2) Mix the fertilizer thoroughly into the top 15cm of soil with a garden spade.
- 3) Spread 5cm to 10cm of compost across the soil surface and mix the organic matter into the dirt just as you did with the fertilizer. This improves the soil structure, adds macronutrients and micronutrients to the dirt, and enhances soil drainage—broccoli requires well-drained soil to thrive.
- 4) Fertilize the soil again, this time 28 days after the broccoli has been planted. Apply fertilizer and scatter the fertilizer onto the soil surface. Do not mix it into the soil, which can disrupt the plants' root systems.
- 5) Water your broccoli well, applying enough irrigation so that the dirt is moist at a depth of 15cm. Use a screwdriver, stick or similar item to test the moisture depth if necessary. This carries the fertilizer's nutrients down to the broccoli plant's roots and guards against nitrogen burns at the plant's base.
- 6) Fertilize a third and final time before harvesting, once the broccoli's head measures about the diameter of a quarter. Use half as much fertilizer as you did in Step 5, and water the plants again immediately after fertilization.

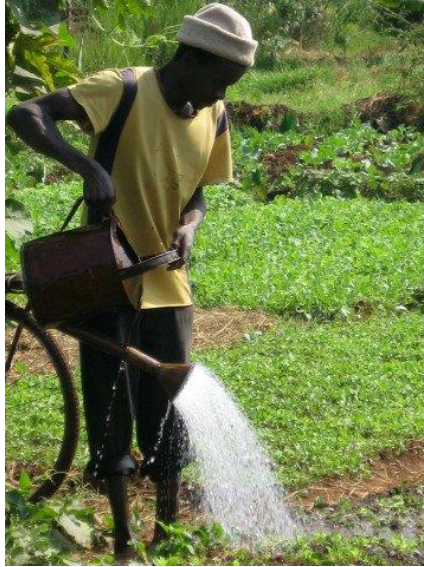
Broccoli: Testing the learning: Fertilisation

- 3 application of fertiliser is applied while growing your broccoli. True/False



Broccoli – Irrigation

Irrigate broccoli seedlings once a day until they are ready to be planted out. Irrigate and moisten the area that is to be planted so that seedlings can be planted into moist ground. Once planted immediately irrigate so that plants can settle into their new environment. Thereafter irrigate between 25 mm and 35 mm of water per week depending on temperature, rainfall and soil type.







Broccoli: Testing the learning: Irrigation

- Thereafter irrigate between 25 mm and 35 mm of water per week depending on temperature, rainfall and soil type. True/False



Broccoli – Diseases and Pest control


Because broccoli is grown through the winter months, pests tend to be less. It is however advisable to monitor and follow a crop protection protocol. Some common pests and disease found are:

Pest	Damage	Solution
<p>Aphids</p> 	<p>They suck plant sap from the leaves. The affected leaves curl and crinkle or form cups and may be completely lined with the aphids. In severe infestations, the plants wilt and die. The plants, if not killed, are dwarfed, grow slowly, and form small light heads.</p>	<ul style="list-style-type: none"> On a smaller scale, as in a vegetable garden, spray the foliage with soapy water, then rinse with clear water. Alternatively, spray the plants with insecticidal soap.
<p>Diamond-back moth</p> 	<p>Adult moths do not cause any damage. The larvae feed on the leaves and the damage progressively becomes more severe as the larvae grow. Interveinal tissue is usually eaten, resulting in a lace-work appearance on the leaves. Large infestations of diamondback moth larvae can often result in complete skeletisation of plants and total crop losses.</p>	<p>Regular observation of plants to find and remove early infestations. Sticky traps can be used to identify times when the adult moths are on the wing.</p>
<p>Root Fly</p> 	<p>When eggs hatch, cabbage root fly larvae tunnel into roots. Plants wilt and shrivel when feeding is heavy. When you pull up wilting plants, rice-size white maggots can be seen feeding on the roots.</p>	<ul style="list-style-type: none"> Remove badly affected plants and wash their roots in warm water to remove maggots. Allow them to drown or feed them to chickens. Regularly hoe and dig around the base of overwintering host plants and also where brassica plants have been growing. This exposes the cabbage root fly pupae to insectivorous birds and predatory beetles.
<p>Cutworm</p> 	<p>Larvae feed on roots and foliage starting in late spring, but damage increases as the larvae gain in size and appetite. In dry summers, cutworms can crawl up plants and chew holes in the foliage that look like damage done by slugs.</p>	<p>As soon as you suspect cutworm damage, use a fork and flashlight to find the culprit at night; one individual cutworm can do significant damage. Check at hourly intervals at night and you can</p>



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		catch them as they show themselves.
<p>Wireworm</p> 	<p>Wireworm feed on the roots of plants and will also create burrows into tubers. Affected plants may wilt and die if roots suffer a large amount of damage.</p>	<ul style="list-style-type: none"> • Regular digging of the soil during the year before and after susceptible plants are grown will expose wireworm to predators and help to reduce their numbers. • There are no biological or chemical (organic or otherwise) control products available for wireworm control.

Diseases	Symptoms	Solution
Black rot	Irregularly shaped dull yellow areas along leaf margins which expand to leaf midrib and create a characteristic "V-shaped" lesion; lesions may coalesce along the leaf margin to give plant a scorched appearance	Primary method of controlling black rot is through the use of good sanitation practices; rotate crops to non-cruciferous crops every 2 years; plant resistant varieties; control cruciferous weed species which may act as a reservoir for bacteria; plant pathogen-free seed
Clubroot	Slow growing, stunted plants; yellowish leaves which wilt during day and rejuvenate in part at night; swollen, distorted roots; extensive gall formation	Once the pathogen is present in the soil it can survive for many years, elimination of the pathogen is economically unfeasible; rotating crops generally does not provide effective control; plant only certified seed and avoid field grown transplants unless produced in a fumigated bed; applying lime to the soil can reduce fungus sporulation.
Powdery mildew	Small white patches on upper and lower leaf surfaces which may also show purple blotching; patches coalesce to form a dense powdery layer which coats the leaves; leaves become chlorotic and drop from plant	<ul style="list-style-type: none"> • Disease emergence favoured by dry season, moderate temperatures, low humidity and low levels of rainfall • Plant resistant varieties; rotate crops; remove all crop debris after harvest; remove weeds; avoid excessive application of nitrogen fertilizer which encourages powdery mildew growth; powdery



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		mildew can be controlled by application of sulfur sprays, dusts or vapors
<p>Sclerotinia stem rot</p> 	Irregular, necrotic gray lesions on leaves; white-gray lesions on stems; reduced pod set; shattering seed pods	<p>Disease emergence favors moderate to cool temperatures and high humidity</p> <p>Rotate crop to non-hosts (e.g. cereals) for at least 3 years; control weeds; avoid dense growth by planting in adequately spaced rows; apply appropriate foliar fungicides</p>
<p>White rust</p>	White pustules on cotyledons, leaves, stems and/or flowers which coalesce to form large areas of infection; leaves may roll and thicken	<p>Fungus can survive for long periods of time in dry conditions; disease spread by wind.</p> <p>Rotate crops; plant only disease-free seed; apply appropriate fungicide if disease becomes a problem</p>
<p>Downy mildew</p> 	Small angular lesions on upper surface of leaves which enlarge into orange or yellow necrotic patches; white fluffy growth on undersides of leaves	<p>Disease emergence favored by cool, moist conditions</p> <p>Remove all crop debris after harvest; rotate with non-brassicas; it is possible to control downy mildew with the application of an appropriate fungicide</p>
<p>Wirestem (Damping-off)</p> 	Death of seedlings after germination; brown-red or black rot girdling stem; seedling may remain upright but stem is constricted and twisted (wirestem).	<p>Disease emergence in seedlings favoured by cool temperatures</p> <p>Plant pathogen-free seed or transplants that have been produced in sterilized soil; apply fungicide to seed to kill off any fungi; shallow plant seeds or delay planting until soil warms</p>

Broccoli: Testing the learning: Pests and Diseases Control

- Broccoli is grown through the winter months, pests tend to be less? True/False
- This stage of planning and growing may not be necessary if you are using natural growing program. If you are not going to use chemicals, please tell us. Using chemicals? Yes /No



Broccoli – Harvesting



When to Harvest Broccoli

The key to harvesting your crop is knowing the right time to pick the heads.

- Let's say you have carefully monitored your plants through the season, watching for pests and disease, weeding, and taking measures to avoid bolting.
- Miraculously, your plants have withstood the elements, and beautiful, full heads have begun to form.
- This is the time to pay extra attention to your plants! Once you notice that the flowering heads have started developing, it is a good idea to check on them each day when you do a pass through the garden.
- And for an extra treat while you are waiting for the main head on each plant to be ready, you can harvest the young leaves!
- They have the same tasty flavour as the heads, and are delicious sautéed in butter or oil.
- You can begin harvesting the leaves when the main head is still small and compact, and has yet to protrude above the tops of the leaves.
- The small, early leaves are best; once the crown begins to open, the leaves become tougher and lose some of their flavour.
- Pick the outermost leaves when they are about 10 to 15cm long.
- Only pick a few leaves at a time, so as not to harm the plant. As new leaves form, you can continue to harvest them throughout the season in the same fashion.
- It is time to harvest when the main heads are a deep green – or perhaps a different shade, depending on the cultivar – and the flower clusters are dense with tightly grouped flower buds.
- It generally takes around 100 days for plants to reach maturity. Though size can vary widely, a good general rule is to harvest when the heads have reached about 10 to 20cm in diameter.
- You want to make sure to pick the heads before the flowers open. Harvest immediately if you notice that flower clusters are beginning to separate, open, or turn yellow.

How to Harvest Broccoli

- The best time to harvest is in the morning, before the heat of the day sets in. Vegetables will be the crispest early in the day.
- Cut the mature heads off the plant with a clean, sharp knife, taking at least 15cm of the stalk.
- Cut the stalk at a point where it emerges from a set of leaves.
- It is a good idea to make a diagonal cut across the stalk, so that water does not pool in the centre and lead to rot.

Broccoli: Testing the learning: Harvesting

- Best time to harvest is in the morning? True/False
- Harvest when the flower clusters are beginning to separate, open or turn yellow. True/False



Broccoli – Safe Storage

Broccoli can be stored in the refrigerator crisper drawer for about 5 days.

Don't wash it before storing, or this will encourage rotting. Instead, wait until just before you're ready to eat it to give it a good rinse under cool, running water.

If, like me, you have grown more than you can possibly eat yourself in 5 days and need a longer-term solution, the best way to store your crop is to freeze it.

Broccoli: Testing the learning: Safe storage

- Broccoli after picking be stored in a refrigerator to keep crisp. True/False
- Never wash the broccoli before storing because speed up the rotting. True/False

PRODUCTION SCHEDULING

Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Soil sampling		X	X	X	X							
Soil preparation			X	X	X	X	X					
Planting			X	X	X	X	X					
Fertilisation			X	X	X	X	X					
Irrigation			X	X	X	X	X					
Pest Control			X	X	X	X	X					
Disease control			X	X	X	X	X					
Weed control			X	X	X	X	X					
Thinning			X	X	X	X	X					
Leaf sampling			X	X	X	X	X					
Harvesting					X	X	X	X	X			
Marketing				X	X	X	X	X	X			



Broccoli – Micro Jobbing

Broccoli: Micro Jobbing

Date	Task	Proof of task
NB!! SEED TAKES 6 WEEKS EXTRA		
Daily	<ul style="list-style-type: none"> • Walk around the crop • Pull out the weeds • Look for any signs of pests <ul style="list-style-type: none"> ➤ caterpillars ➤ cut worm ➤ aphids ➤ lice • Look for an signs of diseases <ul style="list-style-type: none"> ➤ damping off ➤ downey mildew ➤ alterneria • change of leaf colour • flowers formed or dropped • Irrigating your land • Damage from humans and animals • Growth and health • Soil health • need fertilizer/ leaves bubble • Forming of a head • is head productive/ 90 days • is head old needs to be removed • Emergence of seedling from seed • Check for new heads second harvest 	
Day 1	<ul style="list-style-type: none"> • Prepare lands 	<ul style="list-style-type: none"> • Take a photo of the land before you start preparing it.
Day 2	<ul style="list-style-type: none"> • Prepare lands 	<ul style="list-style-type: none"> • Document what you did i.e <ul style="list-style-type: none"> ➤ dig, ➤ bushes



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		➤ take out rocks
Day 3	<ul style="list-style-type: none"> • Prepare lands 	<ul style="list-style-type: none"> •Fertilise with compost or mulching •If you are making your own compost, share a short video
Day 4	<ul style="list-style-type: none"> • Prepare lands 	<ul style="list-style-type: none"> •Level and mound beds
Day 5	<ul style="list-style-type: none"> • Prepare lands • Planting and spacing • Plant the seedlings (seedlings are 42 days old) 	<ul style="list-style-type: none"> •Take a photo of the land once you have made it ready to start planting. •Take a photo of the spacing of each seedlings. •Make sure the soil is moist ready for planting •Use planting stick and dig 4 holes per meter squared •4 seedlings per meter squared planted •Firm seedlings in then water them in •Photograph the planted the field
Weekly tasks		Take a photo of your record book weekly (Tuesday)
	Record amounts of irrigation	Record in your record book
	Rain Fall	Record in your record book
	Add compost or mulching (fertiliser)	Record in your record book
	Remove weeds	Take a photo of the weeds
	Check for any pests (Cut worm ect), if you have spray organic pesticides?	<ul style="list-style-type: none"> •Take a photo of the organic spray using •Take a photo of the pest found •Record in your record book
	<ul style="list-style-type: none"> • Check for damping off • Carry out organic sprays for disease 	<ul style="list-style-type: none"> •Record in your record book •Show us by taking a photo of the diseases •Record in your record book what organic spray you are using
	<ul style="list-style-type: none"> • Carry out audit on crop 	<ul style="list-style-type: none"> •Record in your record book
Weekly tasks (Second Harvest)	<ul style="list-style-type: none"> • Check flower stalk 	<ul style="list-style-type: none"> •check for new heads second harvest
Harvest (First)	After about 12 th or 13 th week this crop is ready to be harvest	Take a short video to show us how you harvest your crop



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Please log the follow at harvest time:		Take a photo when all of the below is completed
	Date of harvest recorded	Record it in harvest book
	Area harvested	Record size of area harvested
	Quantity of heads	Average weight of heads
	Quality/Grade	Harvest Book
	Pack out rate	What % was able to be sold
	Throw away (Quantity)	Record it in harvest book
Harvest (Second)	After about 16 th to 17 th week this crop is ready to be harvest	
Please log the follow at harvest time:		Take a photo when all of the below is completed
	Date of harvest recorded	Record it in harvest book
	Area harvested	Record size of area harvested
	Quantity of heads	Average weight of heads
	Quality/Grade	Harvest Book
	Pack out rate	What % was able to be sold
	Throw away (Quantity)	Record it in harvest book

The above (Weekly tasks) needs to pop up as a reminder every Tuesday for the full growing cycle



Broccoli – Payments

	Crop	Broccoli		
Stages	Stage Definition	Time Line - Weekly payment	% split Paid per paying stages	Payment amount per stage
Stage 1	SEED/SEEDLING PURCHASE	WEEK 0	20,00%	R336,00
Stage 2	BED PREPERATION	WEEK 0	5,00%	R84,00
Stage 3	PLANT SEEDLINGS	WEEK 1	5,00%	R84,00
Stage 4	FEED PLANTS	WEEK 2	5,00%	R84,00
Stage 5	ESTABLISHED PLANTS	WEEK 4	7,50%	R126,00
Stage 6	WEEDING	WEEK 5	7,50%	R126,00
Stage 7	WEEDING	WEEK 9	5,00%	R84,00
Stage 8	HARVEST	WEEK 12	5,00%	R84,00
Stage 9	DELIVERY	WEEK 12	15,00%	R252,00
Stage 10	RECEIVED QUALITY CHECK	WEEK 12	25,00%	R420,00

R1 680,00