

Fruits and Vegetables

1. Broccoli
2. Cabbage
3. Cantaloupe
4. Carrot
5. Cauliflower
6. Celery
7. Corn
8. Cucumber
9. Hot Pepper
10. Lettuce
11. Parsley
12. Passion fruit
13. Pineapple
14. Pumpkin
15. Salad Beans
16. Sweet Peppers
17. Tomato
18. Watermelon

TECHNOLOGY PACKS



PARSLEY



November 2015

Background

Production decisions concerning how much effort and resources to invest and which farming practices to follow, have consequences and create opportunities for the farm affecting production levels, input costs, time constraints, and the potentially size of the operation. They also may have implications for resource use and environmental quality.

Numerous information exist on the various aspects of production and handling/ marketing of crops and livestock, the majority of which are outdated, not easily understood and lacking the where with all for addressing present day challenges such as good agricultural practices (GAPs) and food safety and climate change that impact on the environment and rural livelihoods. These issues are also closely related to the importance of the role of primary producers in increasing the earnings of all actors along the value chain in supporting the development of a commercially viable and sustainable agricultural industry.

The production of high quality and easily understood information packages is critical as this forms a basis for farmers to obtain financing from lending institutions and to efficiently increase their production through the availability of modern technology. This will also result in a reduction of rural unemployment and will greatly help in alleviating poverty and other associated social ills.

TECHNOLOGY PACKS

PARSLEY



November 2015

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Published by

Ministry of Agriculture, St. Lucia

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University of the West Indies
St Augustine Campus,
St. Augustine Trinidad and Tobago, W.I.

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Introduction

This Technological package (Tech Pack) deals with the production and post harvest aspects of parsley.

Also included in the Tech Pack are appendices:

- Template for cost of production
- List of recommended pesticides and application rates
- Good Agricultural Practices data record sheet.

Notwithstanding the identification of any specific pesticide for the control of pests and diseases, this decision is for the discretion of the Ministry of Agriculture Area Extension Officer and the farmer.

However, the mention of any pesticides and other products used in the Tech Pack should strictly comply with local regulations and all instructions provided by the manufacturer. Also, the use of trade names in the Tech Pack is for the purpose of citing examples and is not meant to either endorse or discredit any particular product.

Botanical Description

Parsley (*Petroselinum crispum*) belongs to the family Apiaceae. The local name in Creole is Pési. It is an annual herb, popular for its culinary and medicinal uses. It is recognized for its unique antioxidants, and disease preventing properties.

Ecology and Environment

Parsley grows best in moist, well-drained soil, with full sun. It grows best between temperatures of 70 - 85°F (22 - 30°C), and usually is grown from seed.

Varieties/Cultivars

The main varieties are Moss Curled (Plate 1) and Forest Green Triple (Plate 2).



Plate 1 Moss Curled



Plate 2 Forest Green Triple

Seedling Production

In order to produce strong and healthy seedlings, establish a seedling nursery, specifically for seedling production. The area should comprise two sections:

1. A seed germination section which is covered with solid roof to protect the germinating seeds from sun and rain
2. A hardening section with a transparent roof or netting that allows for the penetration of light for hardening the seedlings. Hardening protects seedlings from transplanting shock when planted in the field.

The entire nursery area should be weed free and preferably totally screened with polyvinyl insect netting to protect seedlings from any insect attack and/or transmitted insect diseases. Seeds are sown either in seedling trays containing peat moss as the growing medium or in peat moss blocks (Plates 1 & 2). Though seeds can be directly sown in the field, the success of germination and survivability of most seeds is not guaranteed as both soil pests and diseases can affect them. To achieve 95 - 100% seed germination and strong and healthy seedlings, seedlings produced in nurseries is the preferred option.



Plate 1 Seedling production in seed trays



Plate 2 Seedling production in nursery



Plate 3 Hardening seedlings

The following practices should be adopted in the production of strong healthy lettuce seedlings:

The following practices should be adopted in the production of strong healthy parsley seedlings:

- When purchasing seed material obtain from a reputable source
- Read the label on the seed package. Ensure that the seeds are 90 - 100% viable which must be indicated on the label and is in keeping with the expiry date
- Use seedling trays for sowing seeds. Ensure that they are sterilized by immersing into

- commercial bleach solution 1 tablespoon/gallon (5 cc/litre) of water
- Use peat moss as the planting medium
 - Treat the planting medium with a broad spectrum fungicide, 6 ounces of Banrot in 15 gallons of water (170 g/68 litres), before placing in trays
 - Seedling trays should be placed on raised platforms
 - Make a planting hole in each cell and plant one seed per hole
 - Water seeds to aid germination
 - Spread peat moss lightly ensuring that the seeds are covered
 - Cover trays with saran netting to hasten germination
 - Place trays in the seed germination section of the nursery
 - Remove the covering of saran netting at the first sign of germination
 - Water seedlings at least twice per day
 - Apply plant nutrient as a foliar spray once per week when seedlings are ½ inch (1.2 cm) in height
 - Spray seedlings with insecticide and fungicide once per week for pest and disease control
 - Apply fertilizer solution, Tropi-Gro 1 tablespoon/gallon (5 cc/litre) of water twice per week when seedlings are 1 inch (2.5 cm) in height
 - Harden seedlings by placing them in the hardening section of the nursery for 3 hours during the early morning and late evening, for 2 - 3 daysm (Plate 3)
 - Expose seedlings to full days of sunlight until ready for transplanting
 - Transplant seedlings when they are 3 inches (7.6 cm) tall.

Land Preparation

There are two main systems of parsley production: small-scale backyard or large-scale field production (Plates 4 and 5). Parsley is a shallow rooted crop so land preparation should not be deep. When cultivated on the ground rotavate or fork and rake the area to obtain a fine tilth. Form beds 4 feet (1.2 m) wide and 8 inches (20 cm) high. Incorporate well rotted organic manure during land preparation for both systems of production.



Plate 4 Back yard parsley production



Plate 5 Large scale production

Spacing and Planting

Plant seedlings at a spacing of 4 inches (10 cm) between rows and 4 inches (10 cm) within the row for each planting hole.

Irrigation

Irrigation water, especially from streams and ponds, should be sent for analysis to ensure that the water is not polluted or saline, and must be of good quality for irrigation. Parsley responds well to irrigation and therefore needs a regular supply of water particularly in the dry season. The most important thing is to keep the soil moderately moist so that the crop will keep producing new leaves.

Fertilization

Specific kinds and rates of fertilizers must be determined from the results of soil and leaf analyses. Composted manure if available should be applied to the soil to help with the uptake of nutrients from inorganic fertilizers; it adds organic matter to the soil, enhances soil structure and growth of micro-organisms. All manure should be well composted to ensure that harmful microorganisms and weed seeds are destroyed.

During transplanting, apply ½ ounce (15 g) per hole of 14-14-14 as basal fertilizer. At 15 and 30 days after transplanting, side-dress with a 1:1 mixture of urea and muriate of potash at the rate of ¼ ounce (8 g) per plant for crisp-head varieties. Loose-leaf varieties need only one side dressing of urea at the rate of ¼ ounce (8 g) per plant 15 days after transplanting.

Under “Protected Agriculture” apply NPK fertilizer (20:20:20) and nitrogen fertilizer weekly at the rate of 0.5 gallon (2l) per hour through a drip line fertigation system.



Weed Control





Weed control of parsley is critical and should be carried out manually.



Pests and Diseases

Diseases are not so prevalent in parsley. The major pests, symptoms and control/management are indicated in Table 1.

Table 1 Symptoms and control of pests of parsley

Pest & Diseases	Symptoms	Control/ Management
 <p data-bbox="201 1339 326 1360">Plate 6 Aphids</p>	<p data-bbox="613 957 1013 1409">Symptoms are stunting, deformation, gall formation, withering and dying of plants. Leaves may become curled, wrinkled or cup-shaped. The symptoms may be due to feeding or viral diseases spread by the aphids. Honeydew secreted by the aphids encourages the growth of sooty mold (black in colour) on the leaves.</p>	<p data-bbox="1036 957 1414 1031">Apply contact and systemic insecticides.</p>
 <p data-bbox="201 1701 375 1722">Plate 7 Army Worm</p>	<p data-bbox="613 1425 1013 1625">The larvae live in the soil. They usually emerge from the soil at night and cut the seedling at the base close to the soil surface damaging the entire plant.</p>	<p data-bbox="1036 1425 1414 1499">Apply a contact or soil insecticide.</p>

Pest & Diseases	Symptoms	Control/ Management
 <p>Plate 8 Cabbage Looper</p>	<p>Young larvae scarify the leaves and older larvae eat irregular shaped holes of various sizes. Loopers can kill young plants if they destroy the growing point.</p>	<p>Use contact or systemic insecticides upon the advice of an area Extension Officer.</p>
 <p>Plate 9 Diamond Back Moth</p>	<p>Young larvae feed between upper and lower leaf surface and may be visible when they emerge from small holes on the underside of the leaf; older larvae leave large, irregularly shaped shot holes on leaf undersides, they may leave the upper surface intact; larvae may drop from the plant on silk threads if the leaf is disturbed.</p>	<p>Use contact or systemic insecticides upon the advice of your area extension officer.</p>
 <p>Plate 10 Fall Army Worm</p>	<p>The first symptoms will be ragged feeding on the top leaves with wet, brown faeces in the area.</p>	<p>Use contact or systemic insecticides upon the advice of your area extension officer.</p>
 <p>Plate 11 Leaf Hoppers</p>	<p>Symptoms are stunted growth or leaves that are curled, stippled, or have a burned appearance.</p>	<p>Elimination of weeds that are alternate hosts to leafhoppers. Also leafhoppers can be controlled by application of foliar and soil applied insecticides.</p>

Pest & Diseases	Symptoms	Control/ Management
 <p>Plate 12 Cutworms</p>	<p>They cut down the young plants/seedlings when they feed, and are capable of destroying an entire field.</p>	<p>Use a contact or soil insecticide around the base of the plants.</p>
 <p>Plate 13 Mole Crickets</p>	<p>Tunnel through soil leaving a subterranean trail.</p>	<p>Apply a soil insecticide to the field.</p>

Good Agricultural Practice (GAP) related to the use of pesticides, requires farmers to maintain up to date records on the application of pesticides to the crop. These records should include trade names, application rates and dates of application. During the harvesting period use pesticides with a very short harvest interval.

Harvesting/Maturity

Leaves are ready for harvest about 70 - 90 days from planting. Harvesting should always be carried out early in the morning when temperatures are cooler to prevent the subjection of plants to heat stress. Progressive harvesting is usually practiced. Harvest leafy stalks by snipping off the stalks (Plates 14). Begin with the outside stalks and place in field crates or buckets (Plate 15) containing water to keep fresh.



Plate 14 Harvesting parsley



Plate 15 Parsley placed in buckets

Field Handling

Field crates should be covered with a damp white cloth to protect the harvested leaves from the heat and evaporation during the harvesting operation. Full crates should be taken away, as soon as possible, from the field to a cooler environment for preparation.

Preparation for Market

The leaves should be crisp, clean and relatively free from discolouration. Remove all diseased, pests or damaged and yellow leaves (Plate 16).



Plate 16 Selection of parsley leaves

Yields

Yields in parsley vary depending on the variety and frequency of harvest.

Storage

Parsley has an extremely high respiration rate. Young leaves respire at a higher rate than old leaves at harvest, but the respiration rate does not decrease as much after harvest in older leaves as in younger leaves, so younger leaves store better. Parsley should be stored at 32°F (0°C) and 95 - 100% relative humidity. In such storage environment parsley should keep for 2 - 2.5 months. Do not store with high ethylene producing commodities.

APPENDICES



APPENDIX I: TEMPLATE FOR COST OF PRODUCTION ANALYSIS: PARSLEY

	Input	Quantity	Units	Unit Cost	Total Cost
1.	Seedling production				
	Seed material				
	Seedling trays				
	Peat moss				
	Saran netting				
	Fungicide, plant nutrient, insecticide, fungicide, fertilizer (specify names used)				
	Total cost for seedling production				
2.	Land preparation				
	Organic manure (if purchased)				
	Other land preparation costs (e.g. equipment rental)				
	Total cost for land preparation				
3.	Crop maintenance				
	Water/irrigation				
	Fertilizer (specify types used)				
	Pest and disease control (specify chemicals etc. used)				
	Total cost for crop maintenance				
4.	Harvest/storage				
	Crates/buckets				
	Estimate any utility costs				
	Transport to market				
	Total cost for harvest/storage				
5.	Labour				
	Seedling production				
	Land preparation				
	Crop maintenance				
	Harvest/storage				
	Total cost for labour				

APPENDIX I: TEMPLATE FOR COST OF PRODUCTION ANALYSIS: PARSLEY

	Input	Quantity	Units	Unit Cost	Total Cost
6.	Rent/insurance				
7.	Miscellaneous costs				
	Total cost of production				

Notes

1. It is recommended that the above data be completed on a per crop basis.
2. The cost of any fixed structures should be considered. For example if a seedling nursery is solely used for to produce parsley seedlings in the year and is expected to last for 10 years, then one tenth of the cost of construction (plus any annual maintenance) should be added at item 7. If, however seedlings for other crops are also produced then these also need to be considered. If parsley seedlings account for half the seedlings in a year, then the annual cost calculated as above needs to be divided by 2. Similar considerations should be given to the cost of any refrigerator, if the crop is stored at a low temperature and to an irrigation system.
3. The revenue obtained from sale of the crop should be compared with the cost of production to determine the profit/loss on the operation.

APPENDIX II: LIST OF RECOMMENDED PESTICIDES AND APPLICATION RATES

INSECTICIDES	APPLICATION RATE
Pronto 35 SC	3 - 5 teaspoons/gallon of water
Target	1 - 2 teaspoons/gallon of water
Pirate	½ - 1 teaspoons/gallon of water
Fastac	1 - 2 teaspoons/gallon of water
Caprid	½ - 1 teaspoon/gallon of water
Diazinon (Basudin)	¾ - 1½ pints/acre
Admiral	¼ teaspoon/gallon of water
Dipel	1½ - 2 teaspoons/gallon of water
Aza-direct	1 - 2 teaspoons/gallon of water
Cure	½ - 1 teaspoon/gallon of water
Danitol	1 - 2 teaspoons/gallon of water
Cypro	½ tablespoon/gallon of water
Dimethoate (Perfection, Rogor 40)	1 pint/acre
Phosvel	1¼ - 2 pints/acre
Orthene	3.2 ounces/acre
Permethrin (Ambush)	½ teaspoon/gallon of water
Padan 50 WSP	2 - 3 teaspoons/gallon of water
Lannate	1 teaspoon/gallon of water
Decis	½ teaspoon/gallon of water
Kelthane 42%	1¼ lb/acre
Orthene 75S	1 lb/acre
Malathion	½ - 1 pint/acre
Sevin	1½ lb/acre
BT (<i>Bacillus thuringiensis</i>)	Label rates
Rotenone	1 - 2 teaspoons/gallon of water
Neem X.	8 - 10 oz/gallon of water
FUNGICIDES	APPLICATION RATE
Bellis	2 teaspoon/gallon of water
Acrobat	2 - 4 teaspoon/gallon of water
Mancozeb (Dithane M45)	1.5 lb/acre
Cabendazim	2 teaspoon/gallon of water
Daconil	1½ - 2 pints/acre
Benomyl (Benlate)	6 oz/acre
Captan	2 - 3 teaspoons/gallon of water
Peltar	3 teaspoons/gallon of water
Manzate DF	2 - 4 teaspoons/gallon of water
Bravo	1½ - 2 pints/acre
Tri-Miltox-Forte	3 teaspoons/gallon of water
Botrilex	5 - 200 lb/acre
Kocide 101	2 - 4 teaspoons/gallon of water
Cupravit	2½ lb/acre

APPENDIX II: LIST OF RECOMMENDED PESTICIDES AND APPLICATION RATES

WEEDICIDES	APPLICATION RATE
DCPA (Dacthal W-75)	10 lb/acre
Diphenamide	4 - 10 lb/acre
Paraquat (Gramoxone)	1 - 2 pints/acre
Dymid 80W	5 lb/acre
Atrazine 80 (Gesaprim).	1¼ - 1½ lb/acre
Linuron (Lorox)	1 pint/acre
Prometryn (Caparol)	0.8 - 1.6 lb/acre
Sethoxydim (Poast)	1¼ - 3½ lb/acre
Clethodim (Select)	0.094 - 0.25 lb/acre
Prometryn 50WP (Geagard)	2 - 3 lb/acre
Herbicidal Oil (Stoddard Solvent, Kerosene oil)	40 - 80 gallons/acre

