SECONDARY PRUNINGS ON WATERMELON YIELD AND QUALITY (75-80 DAYS)

By

BEING A RESEARCH PROJECT SUBMITTED

TO THE DEPARTMENT OF AGRICULTURE SCIENCE,

INSTITUTE OF APPLIED SCIENCES (IAS), KWARA STATE POLYTECHNIC, ILORIN

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF NATIONAL DIPLOMA (ND) IN AGRICULTURE SCIENCE

CERTIFICATION

It is hereby Certified that the project work of Abdurasaq Ismail Adebayon under the supervision of Mr Adeshina Samsudeen and duly approved as having met the standard requirement laid down by the department of agricultural science institute of applied science, kwara state polytechnic, ilorin. That the work has been accepted in partial fulfillment of the requirement for the award of National Diploma (ND) In agricultural Science.

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DEDICATION

I dedicated ths project to almighty God who has made it possible for me to complete my National Diplomal {ND} programme for the loving, kindness protection bestowed on me throughout my time in kwara state polytechnic

I also dedicated this research to my parent MR and Mrs Abdurasaq for their parental care and to all my families and friends

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CHAPTER ONE

1.0 **Introduction**

What is watermelon?

Watermelon (citrollos lanatus) is a flowering plant species of the cucurbitaceae family and the name of it edible fruit.

Watermelon is a large oblong or roundish fruit with a hard green or white often staped or variegated,a sweet watery pink, yellowish or red pulp, and usually many seeds.a watermelon is a large round fruit with green skin, pink flesh and sweet refreshing fruit commonly consomed fresh, used in salad, smoothes and desserts, or picked and preserved.

Watermelon is a nutrition -rich food, low in calories and high in vitamin A and vitamin C (potassium and water content about 92%) making it an excellent source of hydration and a healthy snack.

Watermelon is a culturally significant fruit, symbolizing refreshment, hospitality, and community in many societies, particularly during summer gatherings festival and celebration

Watermelon is a commercially important crop widely cultivated and traded globally, proving income and livelihood for millions of farmers traders and related industries, with the global watermelon market valued at billion of dollars.

1.1 **Historical background of watermelon with reference ancient origins**

Watermelon (citrullus lanatus) is believed to have originated is southern Africa over(4,000 years ago). The earliest knows evidence of watermelon cultivation comes from the (Nile river valley), where it was grown for it's sweet, refreshing flesh

As trade and migration routes expanded, watermelon spread to other part of Africa, Asia, europe.the fruit was introduce other parts to china during the tang dynasty (618-907 CE) and became a popular crop in India, watermelon was mentioned in the ancient ayurvedic text the charaka samhita(400CE)

with the Colombian exchange watermelon was introduced to the Americas, where it became a staple crop in many native American communities. As a globalization increased, watermelon

production and trade expanded globally with china, turkey and United States becomingajor producers

Today watermelon is grown in over 100 countries with modern breeding programs focused on improving disease resistance yield and flavor. The development of seedless watermelons in the 20th century revolutionized the industry, making watermelon a covineniet and popular snack

VARIETY OF WATERMELON by research and development council (WRDC), the united crop department of Agriculture (USDA)

1 Charleston grey

A popular hairloom variety, known for its grey-green rind and sweet, juicy flesh

2. Crimson sweet

A hybrid variety recognized for it's sweet, crimson flesh and High water content

3. Sugar baby

A compact, bush type variety, ideal for small garden and container, producing sweet, juicy fruit.

4. Yellow doll

A unique variety featuring a yellow flesh and sweet, honey like flavor

5. Orangeglo

A variety with a distinctive orange flesh and sweet, slightly tangy flavors

6. Moon and stass

A heirloom variety characterized by its yellow flesh, speckled with small, star-shaped markings

7. Black diamond

A hybrid variety known for its high yield sweet flavor and dark green, diamond-shaped markings

8. Golden crown

A variety featuring a golden-yellow flesh and sweet, slightly tangy flavor

Congo

A hybrid variety known for its high yield, sweet flavor, and dark green smooth ring

Sugar moon

A hybrid variety known for its high yield sweet flavor and attractive yellow-green rind

Zebra

A variety featuring a striped green and yellow rind and sweet, juicy flesh

ORANGE FLESH BLACK DIAMOND

A hybrid variety featuring a dark green rind and orange sweet flesh

Queen of heart

A hybrid variety, recognized for it's high yield, sweet flavor, and attractive, yellow-green rind

1.2 Aim and objective

To evaluate impact of secondary branches pruning on the quality and quantity of watermelon

1.3 Specific Objective

- To determine the sprouting days
- To examine the growths parameter
- To examine the impart of pruning o the fruit quality and quantity

1.4 Statement of the problem

Watermelon a crop two fairly weather condition rainy and sunny due to the nature of the crop (Watermelon). On heavy raining time or period its cause discarding of flowering nature of watermelon and water inadequate will affect normal growth development

Flower discarding will result to lack of palliative which will affect maturity and production of appreciable watermelon fruits and in adequate rainfall will definitely affect the growth stages

1.5 Justification

Soil as the basic medium for watermelon production all over the world, there should be basic nutrient requirement of any soil meant for planting of watermelon. Carbon, hydrogen and oxygen, plant get must of their elemental nutrient from the soil through their root system and soil conclusion can have significant impact on the nutrient availability soil nutrient concentrations, soil PH, drainage properties, and compaction all affect the plant the plant ability to obtain needed nutrients.

CHAPTER TWO

LITRATRATURE REVIEW

2.1 BASIC NUTRIENT REQUIREMENT OF A SOIL FO WATERMELON PRODUCTION

Carbon, hydrogen and oxygen plant get most of their element nutrient from the soil through their root system and soil condition have significant impart on the nutrient availability. Soil nutrient concentration, soil PH, drainage properties and compaction all affect the plants ability to obtain needed nutrient. For watermelon soil PH level should be between 6.0 and 6.5

Nitrogen (N) deficiency is the most common nutrient problem for watermelon production deficiencies at any time during the season can affect crop yield and quality and deficiencies when fruit size range from 4- to 6 inches in diameter can be the most damaging up take from the soil is usually low easily in the season before the runners stage. The uptake of rapidly increase from early runner to 3 inches melon stage when uptake reaches its peaks. When fruit reach the 6 to 10 inch stage the uptake of start to decline and this decline continues through to the final harvest.

2.1.1 Physical Soil Requirements

- well-dranning soil watermelon need well-dranning soil to prevent water togged soil conditions which can lead to root rot and other disease
- good aeration the soil should have good aeration to promote healthy root growth and development
- Optimal soil depth the ideal depth for watermelon is 60-90cm (24-35m) allowing for adequate root growth and water uptake
- soil chemical requirements

2.1.2 Chemical Soil Requirements

- PH range: watermelon prefers a slightly acidic to neutral soil PH, ranging from 6.0 to 6.8 PH outside the range can lead to nutrient deficiencies and reduced growth
- *Nutrient -rich soil: watermelon require a nutrient rich soil with adequate level. A balanced fertilizer program can help provide these essential nutrients.

- Micronutrients: watermelon also requires micronutrients,which play important roles in plant growth and development

2.1.3 Biological Soul Requirements

- Soil biota: a healthy soil biota including beneficial micro organisms is essential for watermelon growth.these organisms hell to break down organic matter, solubilized mineral and suppress plant pathogens
- *Organic matter:incorporating organic matter like compact or manure can improve soil structure,fertility and over rall health. This can lead to improved watermelon growth yield and quality

2.2 WATERMELON MANAGEMENT ON THE FARM

2.2.1 Pre-Planting Management

- **Land preparation:** prepare the land by leveling and grading to ensure prosper drainage
- **Soil preparation:** prepare the soil by ploughing or tilling to a depth of 30-40cm. Add organic matterkle compost or manure to improve soil fertility and structure
- **soil testing:** conduct soil test to determine the PH and nutrient level based on the test results apply the necessary fertilizer and amendment
- **Seed selection:** selecting high quality seed that are suitable for your climate and soil type.

2.2.2 Planting Management

- **Sowing time:** plant watermelon seeds in late spring to early summer, when the soil has warmed up at least 15°C
- **Sowing depth:** sow the seeds 2-3cm deep and 1-2cm plant
- **Row spacing:** plant the rows 2-3meters apart to allow for prosper air circulation and sunlight penetration
- **Irrigation:** irrigate the soil gently but thoroughly after planting

2.2.3 Post-Planting Management

- **Thinning:** thin the seeding to 30-60cm apart to allow for prosper growth and development
- **Fertilization:** apply a balanced fertilizer (e.g 10-10-10npk) at planting time, followed by side-dressing with a high - phosphorus fertilizer (e.g, 10-20-10npk) when the vines start to spend.
- **Pest and disease management:** monitor the crop regularly for pests and disease and apply integrated pest management (ipm) strategies as needed
- **Prunning:** prune the vines to promote bushy growth and encourage fruiting

2.2.4 Irrigation Management

- **Irrigation schedulling:** irrigate the crop when the top 5-10cm of soil feels dry to the touch
- **Water depth:** apply 2-3cm of water per irrigation event
- **Drip irrigation:** consider using drip irrigation to reduce water waste and promote efficient water use.

2.2.5 Harvesting And Post-Harvest Management

- **Maturity :** harvest watermelon when they are fully mature, typically 70-80days after planting
- **Harvesting techniques:** cut the fruit from the vine using a sharp knife or pruning shears
- **Post-harvest handling:** handle the fruit carefully to avoid brushing of damage, store the fruit in a cool, dry place to prolong shelf life

2.3 WATERMELON LIFESPAN

Germination stage(7-10days), university of Florida extension,2020

Seed germination: watermelon seeds germinate when the soil temperature reaches 15-20°c(59-68°f)

Radicle emergence: the radicle(primary root) emerges from seed, followed by the cotyledon (seed leaves)

2.3.1 Seedling stages (1-2weeks), journal of hot sciences vol.45, no5,2010

- **Cotyledon expansion:** the cotyledon expand and become green, starting photosynthesis
- **True leaf emergence:** the first true leaves emergence marking the beginning of the seedling stages

2.3.2 Vining Stage(3-4weeks)

- **Vine growth:** the watermelon vine starts to grow producing long,sparawling system
- **Leaf expansion**: the leaves expand and become larger increasing photosynthesis and growth(journal of plant photosynthesis,vol169,2012

2.3.3 Flowing Stages (1-2 Week)

- **Male flowers emergence:** the first male flowers emerge, production pollen.(journal of hotsciences,vol.41,no.5,2012)
- **Female flowers emergence:** the first flowers emerge, containing the ovary and stigma.(journal of agricultural science,vol.153,no.3,2015)

2.3.4 Fruit Stage(4-6weeks)

- **Pollination:** bees and other pollinators transfer pollen from the male flower the female flowers allowing fertilization to occurs (journal of hotsciences,vol.48 no5,2013)
- **Fruit growth:** the fertized ovary develops into a watermelon fruit, growing in size and weight.(journal of plant physiology vol.170,no.10,2013)

2.3.5 Maturation Stage (2-4weeks)

- **Fruit ripening:** The watermelon fruit ripens,turning yellow or creamy yellow on the underside.(journal of hotsciences,vol.49.no.10,2013)
- **Sugar accumulation:** the fruit accumulates sugars, becoming sweeter and more flavorful.(journal of agricultural science,vol.154,no 3,2016)

2.3.6 Harvest Stage

- **Fruit maturity:** the watermelon fruit is mature and ready for harvest typically 70-80 days after sowing.(university of Florida extension,2020)
- Harvesting: the fruit is cut from the vine,leaving a small piece of stem attached.(north Carolina state university extension,2020)

2.4 IMPORTANT OF WATERMELON

2.4.1 Nutrional importance

- **Risch is vitamin and mineral:** watermelon is an excellent source of vitamin A and C, potassium and magnesium.
- **Antioxidant properties:** watermelon contain antioxidant like lycopene and cucurbitacin E, which help protect against oxidative stress and inflammation
- **Hydration:** watermelon is made up of about 92% water, making it an excellent source of hydration

2.4.1 Health Benefit

- **Cardiovascular health:** the potassium content in Watermelon help to lower blood pressure and reduce the cardiovascular disease
- **Anti-inflammatory effect:** the antioxidant and anti-inflammatory compounds in watermelon may help to reduce inflammation and improve symptoms of conditions like arteries
- **Cancer prevention:** the lycopene in watermelon has been shown to have anti-cancer properties, particularly in reducing the risk of prostate cancer.

2.4.2 Economic Importance

- **Global production:** watermelon is one of the most widely produced and consumed fruit globally, with over 100million mertictons produced annually
- **Employment opportunities:** the watermelon industry provide employment opportunities for millions of people worldwide, from farming to processing and distribution
- **Economic benefits:** watermelon production and trade can generate significant economic benefits for farmers,processor and exporters

- **Watermelon tea:** watermelon can be infused in hot water to create a refreshing and caffeine -free tea

2.4.3 Environmental Importance

- **Water conservation:** watermelon is a drought-tolerant crop, requiring less water than many other fruits and vegetables
- **Soil health:** watermelon has a deep taproot which help to improve soil health by increasing soil organic matter and reducing erosion
- **Biodiversity:** watermelon is a diverse crop with many different varieties and cultivars, which help to maintain genetic diversity and promote biodiversity

2.5 POSSIBLE PRODUCT PROCESSING OF WATERMELON

2.5.1 Fresh Products

- **Fresh cut watermelon:** fresh watermelon can be cut into cubes,slices or chunks and package for fresh consumption.
- **Fresh watermelon juice:** fresh watermelon can be juiced and package for immediate.

2.5.2 Processed Product

- **Watermelon jam:** watermelon can be cooked with sugar and pectin to create a sweet and tangy jam.
- **Watermelon puree:** watermelon can be cooked and proposed to create a smooth and pureed to create a smooth and creamy puree Cornell
- **Watermelon juice concentrate:** watermelon juice can be concentrated through evaporation of freeze-drying to create a concentrated juice
- **Watermelon powder:** watermelon can be dried and powdered to create a convenient and shelf-stable powder.

2.5.3 Beverages

- **Watermelon juice:**fresh watermelon can be juiced and packaged for consumption

- **Watermelon smoothes:** watermelon can be blended with yogurt andilk to create a refreshing and healthy
- **Watermelon tea:** watermelon can be infused in hot water to create a refreshing and caffeine -free tea

2.5.4 Cosmetics

- **Watermelon seed oil:** watermelon seed can be pressed to extract a rich and nourishing oil for cosmetic.journal of cosmetics, dermatological science and application, vol.10,no 2,2020
- **Watermelon extract:** watermelon can be extracted to create a concentrated extract for use in cosmetics.journal of pharmacy and pharmacology vol.72,no.8,2020

CHAPTER THREE

MATERIAL AND METHOD.

3.0 Experiment material

- Small Bucket Pavorated
- Pipe Parvorated As Dripping Means Of Irrigation
- Watermelon Seeds
- Granit
- Warmly Soil
- 50 Litre Jerrycana
- Thread
- Ruler/ Measuring Tape
- poultry dropping (manure)

3.1 Experimental Set-Up

Those buckets were pavorated for easy dranage and grant was packed inside the bucket as parent-material to allow easy drainage and airation from the base, after which mixture of warmy soil and poultry dropping at ratio 2:3/4

The mixture inside the bucket was watered for a week then watermelon seeds were planted two seeds per hole in three places per bucket and have a total number of five in a roles in four columes, making(20)twenty bucket.

At two weeks thinking was carried out and experimental determinant or measurement started to determine the impact of secondary branches pruning on the quantity and quality of watermelon fruits within 75days-50days

3.2 Experimental Determinant

The experiment based on the impact of secondary branches pruning or training on the quantity and quality of watermelon fruits. As al.(35) Thirty five days of all the watermelon experimental set-up the plant pots was divided into experiment and control, some set of watermelon plant were based on pruning of the secondary branches, observation and data collection was based on the watermelon fruits on the quality and quantity compared to the watermelon plant under control.

Furthermore was determined at every ten day-interval to identify the quality and quantity based on the data collected.

3.3 Study Area

The experiment was conducted at teaching and researcher agro-biological garden department of agricultural technology, instituted of applied science.kwara state polytechnic Ilorin, Kwara state .Kwara state polytechnic was located in guinea savannah belt on the longitude 8° 12° and latitude 4° 15° with the annual rain fall of about 1250-1500mm per annum,usually for duration of not less than 5-6months

3.4 Data Collection

Data collection was determining based on the growth performance of watermelon fruits, fruit interval, fruit-weight and fruit colour parameter per pots replicates.

The raw data in table: related plant parameter per pots replicates on numbers of fruit. Fruit interval fruits weight and colour while table II review the commutative frequency of table I and the sumtion of experiment I and II cumulative frequency raw data to draw the result of the watermelon growth parameter.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

In table i.v the final results on pruning and non pruning of water melon showed that non pruning water melon has the highest number of fruits of 12 compare to pruning with 7 number of fruits

Also the fruit interval in pruning was wider with 4.6cm to 3.5cm of non pruning water melon in while that of water melon fruit weight on pruning was 612gram to 281gram on Ono pruning watermelon, the fact behind this was that the number of fruits in non pruning was more 12 fruits per watermelon plant to 7fruits on pruning watermelon.

There was also that colour variation due to number of fruits production per plant, due to the sense that the same treatment and under the same weather and atmosphere condition than(during dey season)

Table i

Exp 1

Data collection

Frequency raw data

Pruning	Number fruits	Fruit interval	Fruit weight	Fruit colour
Pot A	8	5cm	700g	
Pot B	6	7cm	500g	Deep light green
Pot C	7	7cm	400g	
Pot D	5	3cm	600g	

Non Pruning	Number fruits	Fruit interval	Fruit weight	Fruit colour
Pot A	12	4cm	300g	
Pot B	15	4cm	200g	Fairly light green
Pot C	8	5cm	250g	
Pot D	10	3cm	400g	

Frequency raw data

Experiment ii

Pruning	Number fruits	Fruit interval	Fruit weight	Fruit colour
Pot A	5	4cm	600g	
Pot B	6	4.5cm	700g	
Pot C	4	5cm	800g	Fairly light green
Pot D	8	4cm	600g	

Non Pruning	Number fruits	Fruit interval	Fruit weight	Fruit colour
Pot A	14	3cm	300g	
Pot B	12	3cm	300g	
Pot C	15	2cm	200g	
Pot D	8	4cm	300g	

Table ii

Expirement I & ii

Cumulative frequency

Raw data

Pruning	Number fruits	Fruit interval	Fruit weight	Fruit colour
Pruning i	6.5	5.5cm	55.2.5g	
Pruning ii	5.75	4.25cm	675g	Deep high green
E i and ii	12.1	9.8	122.5g	

Experiment I & II

Experiment	Number fruits	Fruit interval	Fruit weight	Fruit colour
Non Pruning	11.25	4cm	287.5g	
Non Pruning	12.25	3cm	275g	Fairly light green
E i	23.6	7	565.5g	

Table iii

Average sumination of experiment I and ii on pruning and non pruning respectively.

Number of fruit	Fruit interval	Fruit weight	Fruit colour
Pruning I 6.5	5.54	550g	
Pruning ii 5.6	4.3	675g	Deep light green
E I & ii 12.1	9.8/2	1,225/2	
=6.5	=4.6	=612gram	

Number of fruit	Fruit interval	Fruit weight	Fruit colour
Non Pruning I 11.3	4	287.5g	
Non Pruning ii 12.3	3	275.0g	Deep light green
E I & ii 23.6	7/2	562.5/2	
=11.8	=3.5	=281.3gram	

Table i.v

Final result on pruning of watermelon branches

Number of fruit	Fruit interval	Fruit weight	Fruit colour
6.5	4.6	612g	Fairly light green

B

Non pruning of watermelon branches

Number of fruit	Fruit interval	Fruit weight	Fruit colour
11.8	3.5	281.3g	Deep light green

CHAPTER FIVE

RECOMMENDATION AND CONCLUSION

RECOMMENDATION

According to the experiment data collection and the statistical analysis on pruning and non pruning of secondary branches of water melon they are hereby recommend to water melon farmer to adupte pruning of some secondary branches if it would not be too stressful although theme is likely to have low number of fruits compare to that of non pruning water melon secondary branches but the fruit weight will have additional value to the fruits,which will earn farmer most profit

CONCLUSION

In conclusion the experiment favour both pruning and non pruning of secondary water melon branches value-visa in respect to more fruits less fruit and more fruits weight on pruning watermelon secondary branches.

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