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**INVESTIGATING CRITICAL LEVELS OF
DRY ROTTING OF YELLOW YAM
(DIOSCOREA CAYENENSIS) PLANTING
MATERIAL, THE BENEFITS OF
DISINFESTING THE HEADS OF
PRATYLENCHUS COFFEAE AND OF
AFTER-PLANTING
NEMATICIDE TREATMENTS**

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INVESTIGATING CRITICAL LEVELS OF DRY ROTTING OF YELLOW
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OF DISINFESTING THE HEADS OF PRATYLENCHUS COFFEA AND OF
AFTER-PLANTING NEMATOCIDE TREATMENTS 1/

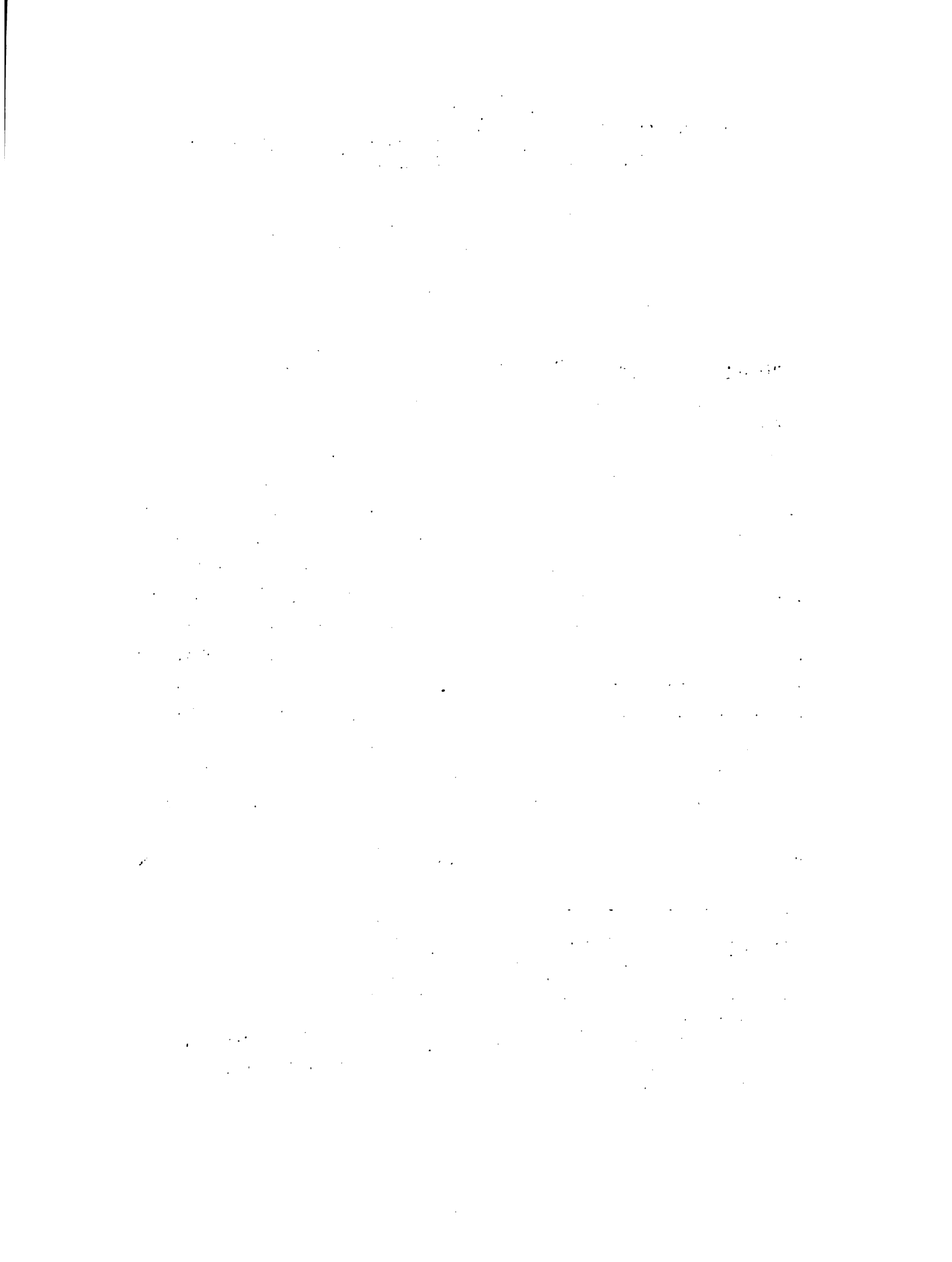
D. G. Hutton, A. H. Wahab and J. Dehaney 2/

ABSTRACT

Several noxious nematodes are associated with yams (Dioscorea spp) in Jamaica but Pratylenchus coffeae is the only one found infesting yellow yam (D. cayenensis) tubers affected by a dry rot called "burning". There was earlier and significantly more sprouting of lightly or heavily dry-rotted yellow yam heads (planting material) which were dipped for 40 min in a 1500 ppm Oxamyl solution or lightly dry-rotted undisinfested heads and plants arising from them developed more vigourously (as measured by vine height and leaf size) compared with heavily dry-rotted undisinfested heads. There was significantly less bearing plants in plots planted with the heavily dry-rotted undisinfested heads; greatest gross weights of tubers and of marketable yams were borne in plots planted with lightly or heavily dry-rotted undisinfested heads and lightly dry-rotted undisinfested heads. Oxamyl or Ethoprop applied 11, 22 and 33 weeks after planting suppressed populations of P. coffeae in soil and roots at 39 weeks but did not influence quantitative production; tubers from Oxamyl-treated plots showed significantly less of the dry rot. The dry rot appears to damage or destroy stem and root primordia resulting in badly affected

1/ Part of studies conducted jointly by the Ministry of Agriculture (MINAG), Jamaica and the Inter-American Institute for Co-operation on Agriculture (IICA) at Olive River, Trelawny on the Project titled "Hillside Farming Development Project".

2/ Nematologist, Plant Protection Division, MINAG, Agricultural Research Specialist, IICA and Soil Conservation Officer, MINAG, respectively.



planting material not sprouting or plants not being vigorous. Conditions favouring rapid development of the dry rot seem to prevail after heads are planted. Disinfestation suppresses populations of the nematodes associated with the dry rot and development of the rot itself. Results suggest that only those yellow yam heads with the least evidence of the dry rot or disinfested heads should be planted. It is recommended that an agency be established to see to the disinfestation of yam planting material in the first instance and eventually be responsible for providing "clean" planting material.

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INTRODUCTION

Yam (Dioscorea spp) tubers in Jamaica are affected by a dry rot, called "burning" or "burn", with which parasitic nematodes (Pratylenchus coffeae, Scutellonema bradys and Hoplolaimus sp.) are associated. The dry rot is characterised by cracking in the skin underlaid by a corky rot in the storage tissues (2,8). No yellow yam (D. cayenensis) tuber free of P. coffeae has yet been found by the senior author; to date, this is the only noxious nematode found infesting tubers of this cultivar. It seems that the dry rot, which spreads over the tuber's surface and progresses deeper into the yam tissues as tubers or parts of tubers are stored prior to being planted, damages or destroys stem and root primordia. Thus, plants arising from severely dry-rotted heads might be unthrifty or such heads might not sprout resulting in poor stands. In previous trials, disinfesting yam planting material by hot water or nematicide dips resulted in suppression of noxious nematodes and development of the dry rot, higher and earlier germination and vines that were more vigorous compared with undisinfested heads. In trials using yellow yams, significantly more Oxamyl-disinfested heads sprouted than undisinfested heads (1,7).

With certain crops (plantain, banana, some ornamentals, etc.), post-plant nematicide treatments are a standard feature of nematode control. In a trial with yellow yams, tubers from plots treated with a nematicide twice during the season were less affected by the nematode-related dry rot than tubers from untreated plots (7). If indeed the dry rot damages/destroys stem and root primordia, then any treatment which causes tubers or parts of tubers used as planting material to have less of the dry rot would be beneficial.

This trial was carried out to determine (i) the critical levels of dry rotting of yellow yam heads, i.e., the level at which significant damage/destruction of stem and root primordia might occur and the level of dry rotting which therefore is acceptable in

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planting material, (ii) the benefits of disinfesting heads having the extremes of dry rotting (light or heavy) of noxious nematodes, Pratylenchus coffeae in this case, and (iii) the effects of post-plant nematicide treatments in reducing the levels of dry rotting on harvested tubers as well as on quantitative yields.

MATERIALS AND METHODS

Light and severely dry rotted yellow yam heads were selected from a batch of recently-harvested tubers. The first group consisted of heads with less than 15% of the surface having symptoms of the dry rot and with depth of any dry rot ranging from 1 - 2 mm (avg. 1.5 mm). The second group consisted of heads with more than 66% of the surface having the dry rot with depth of the rot ranging from 4 - 11.5 mm (avg. 6.6 mm). One-half of the yams from each group were dipped for 40 min in a 1500 ppm solution of Oxamyl (Methyl N'N'-dimethyl-N-((methylcarbamoyl)oxy)-1-thiooxamimidate). Three days later, the heads were planted 0.67 m apart on continuous contour mounds spaced 1.5 m apart giving a crop density of 10,000 plants/ha. The site had been cropped to yellow yams continuously for at least 10 years. Eleven, 22 and 33 weeks after planting, plots were treated with Oxamyl G (12.2 kg ai/ha), or Ethoprop G (O-Ethyl S, S-dipropyl phosphorodithioate) (13.9 kg ai/ha), or left untreated giving 12 treatments viz:

1. Heavily dry-rotted heads dipped in Oxamyl; Ethoprop applied post-planting
2. Heavily dry-rotted heads dipped in Oxamyl; Oxamyl applied post-planting
3. Heavily dry-rotted heads dipped in Oxamyl; no post-plant treatment
4. Heavily dry-rotted heads untreated; Ethoprop applied post-planting

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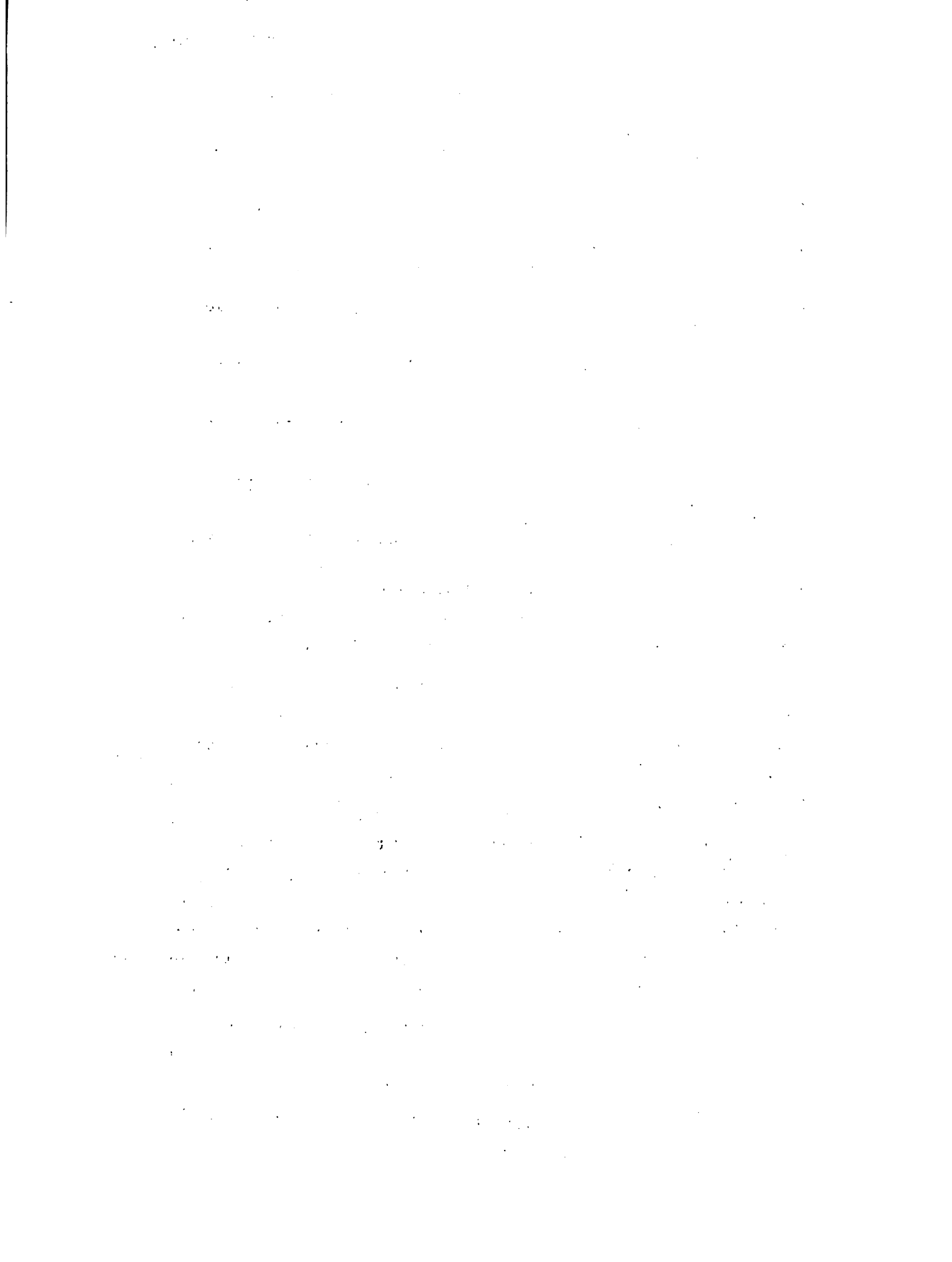
5. Heavily dry-rotted heads untreated; Oxamyl applied post-planting
6. Heavily dry-rotted heads untreated; no post-plant treatment
7. Lightly dry-rotted heads dipped in Oxamyl; Ethoprop applied post-planting
8. Lightly dry-rotted heads dipped in Oxamyl; Oxamyl applied post-planting
9. Lightly dry-rotted heads dipped in Oxamyl; no post-plant treatment
10. Lightly dry-rotted heads untreated; Ethoprop applied post-planting
11. Lightly dry-rotted heads untreated; Oxamyl applied post-planting
12. Lightly dry-rotted heads untreated; no post-plant treatment.

The 12 treatments were replicated thrice using a randomised complete block design. The nematicides applied after planting were sprinkled onto the ground around plants then worked in lightly.

Six, seven, nine, 11 and 22 weeks after planting, sprouted heads were counted. At six, nine and 11 weeks, vine height was measured. The width of leaves was taken at six (first node) and 17 weeks (second node). Samples of soil and root material were taken at 39 weeks for estimating levels of P. coffeae.

At harvest (47 weeks), P. coffeae in soil and tuber skin (peeling) was again counted. Each tuber was rated for the nematode-related dry rot on a 1 - 5 scale where 1,2,3,4 and 5 signified that 1-20%, 21-40%, 41-60%, 61-80% and 81-100% respectively of the tuber's surface was affected by the dry rot. Gross tuber weight, weight of heads and weight of marketable yams produced by each plant were recorded.

This trial was carried out at Olive River, an adjunct to the Allsides Pilot Development Project, on a site farmed co-operatively by the Inter-American Institute for Co-operation on Agriculture and the Ministry of Agriculture, Jamaica. Plots were fertilized with a



mixture of $N:P_2O_5:K_2O(12:24:12)$ at the rate of 1460 kg/ha, split in two applications at six and 14 weeks from sowing. Economy of staking was achieved by using one 6-8 meter long bamboo stake for every four plants.

RESULTS

Heavily dry rotted heads which remained undisinfested of P. coffeae took longer to sprout compared with heavily dry rotted disinfested heads and lightly dry rotted disinfested or undisinfested heads. Six, seven, nine and 11 weeks after planting, significantly more of the lightly dry rotted disinfested or undisinfested heads had sprouted compared with heavily dry rotted undisinfested heads. Sprouting of heavily dry rotted heads dipped in Oxamyl occurred significantly earlier than heavily dry rotted undisinfested heads. Overall, lightly dry rotted heads which remained undipped sprouted earliest (Table 1). Plants arising from heavily dry rotted undisinfested heads were least vigorous as measured by vine height and leaf size (Table 1).

At 39 weeks from planting, highest numbers of P. coffeae were found in soil and root samples from plots which received no post-plant nematicide treatment. However, soil and root samples from plots in which undisinfested, heavily dry rotted heads were planted and which received no post-plant nematicide treatment contained comparatively low levels of the nematode. Treatments with Ethoprop or Oxamyl suppressed P. coffeae but roots of plants from the Ethoprop-treated plots harboured lowest levels of the nematode at 39 weeks. However, at harvest there was no difference in the levels of P. coffeae in soil nor skin of tubers irrespective of whether plots were treated with a nematicide or not (Table 2).

There was no evidence that the post-plant nematicide treatments influenced gross tuber production but Oxamyl treatments resulted in significant reductions in the dry rot ('burning')

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection procedures and the use of advanced analytical techniques to derive meaningful insights from the data.

3. The third part of the document focuses on the role of technology in data management and analysis. It discusses how modern software solutions can streamline data collection, storage, and processing, thereby improving efficiency and accuracy.

4. The fourth part of the document addresses the challenges associated with data management, such as data quality, security, and privacy. It provides strategies to mitigate these risks and ensure that the data remains reliable and secure throughout its lifecycle.

5. The fifth part of the document discusses the importance of data governance and the role of various stakeholders in ensuring that data is used ethically and in compliance with relevant regulations.

6. The sixth part of the document provides a detailed overview of the data lifecycle, from data creation and collection to data storage, processing, and final disposal. It emphasizes the need for a clear and consistent data lifecycle policy.

7. The seventh part of the document discusses the role of data in decision-making and the importance of providing timely and accurate information to management and other stakeholders.

8. The eighth part of the document provides a summary of the key findings and recommendations of the study. It emphasizes the need for a comprehensive data management strategy that integrates all aspects of data collection, storage, and analysis.

9. The ninth part of the document discusses the future of data management and the potential impact of emerging technologies such as artificial intelligence and machine learning on data analysis and decision-making.

10. The tenth part of the document provides a final conclusion and a call to action for the organization to implement the recommended data management practices and ensure the long-term success of its data-driven initiatives.

observed on harvested tubers (Table 3). However, planting lightly dry-rotted heads or heads disinfested of P. coffeae clearly influenced gross tuber yields. There was significantly less bearing among plants from heavily dry-rotted undisinfested heads compared with those from lightly dry-rotted undisinfested heads or disinfested heads. Lowest tuber yields were observed in plots planted with heavily dry-rotted undisinfested heads. Highest yields were produced by plants arising from lightly dry-rotted disinfested heads (Table 3).

DISCUSSION

Results from this trial indicate that as the nematode-related dry rotting on yellow yam heads becomes more severe, the more unfit these heads become as planting material. Degras and Mathurin (4) reported that as tubers of certain Dioscorea spp mature, undifferentiated cellular blocks appear in the deep cortical layers. These cellular blocks are later involved in morphogenesis generally according to a gradient in favour of the stem end of the tuber. It appears that as the dry rot spreads and penetrates deeper into the yam head, these cellular blocks are injured or destroyed. The ability of badly affected heads to produce vigorous plants would gradually diminish and eventually when all primordia are destroyed, such heads would not germinate. It seems that when yam heads are planted, soil temperature and moisture favour rapid development of populations of noxious nematodes and of the nematode-related dry rot and as a consequence, primordia are injured or destroyed. Disinfestation of yam planting material has been shown to suppress populations of invading nematodes and development of the dry rot and disinfested planting material produced vigorous plants (6).

Results of this trial demonstrate that there are advantages to using planting material with little evidence of the dry rot; disinfestation provides further benefits, especially increased tuber yields. In the case of heads severely affected by the dry

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text notes that records should be kept for a minimum of seven years and should be accessible to authorized personnel at all times.

2. The second part of the document outlines the specific requirements for record-keeping. It states that all transactions must be recorded in a clear and concise manner, using a standardized format. This includes recording the date, amount, and description of each transaction. The text also requires that records be kept in a secure and protected environment, with access restricted to authorized personnel only.

3. The third part of the document discusses the role of internal controls in ensuring the accuracy of records. It notes that internal controls should be designed to prevent errors and fraud, and to ensure that all transactions are properly recorded. The text emphasizes that internal controls should be regularly reviewed and updated to reflect changes in the business environment.

4. The fourth part of the document discusses the importance of training and education for personnel involved in record-keeping. It states that all personnel should receive appropriate training and education to ensure that they are able to perform their duties accurately and efficiently. The text also notes that training should be ongoing and should cover both technical and ethical aspects of record-keeping.

5. The fifth part of the document discusses the role of external audits in ensuring the accuracy of records. It notes that external audits are conducted by independent auditors who are not affiliated with the organization. The text states that external audits provide an objective and unbiased assessment of the organization's financial records and internal controls. It emphasizes that external audits are essential for the credibility of the financial system and for the detection of fraud.

6. The sixth part of the document discusses the importance of transparency and accountability in record-keeping. It notes that records should be accessible to all stakeholders, including investors, creditors, and the public. The text emphasizes that transparency and accountability are essential for the integrity of the financial system and for the ability to detect and prevent fraud.

7. The seventh part of the document discusses the role of technology in record-keeping. It notes that technology has revolutionized record-keeping, making it more efficient and accurate. The text states that electronic records are more secure and more accessible than paper records, and that they can be easily shared and analyzed. It emphasizes that technology should be used to enhance the accuracy and efficiency of record-keeping.

8. The eighth part of the document discusses the importance of regular reviews and updates of record-keeping policies and procedures. It notes that record-keeping policies and procedures should be regularly reviewed and updated to reflect changes in the business environment and in the technology used for record-keeping. The text emphasizes that regular reviews and updates are essential for the effectiveness of record-keeping.

9. The ninth part of the document discusses the role of the board of directors in ensuring the accuracy of records. It notes that the board of directors is responsible for the overall management of the organization, including the management of financial records. The text states that the board of directors should regularly review and approve record-keeping policies and procedures, and should ensure that they are properly implemented.

10. The tenth part of the document discusses the importance of a strong ethical culture in record-keeping. It notes that a strong ethical culture is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text emphasizes that all personnel should be held to a high standard of ethical conduct, and that any violations should be promptly and appropriately addressed.

rot, disinfection results in earlier and more sprouting, increased vigour of plants and increased quantitative yields. It appears that poor stands and more non-tuber bearing plants were the important factors related to decreased quantitative yields when heavily dry-rotted undisinfested heads were planted compared with lightly dry-rotted heads or disinfested heads.

Post-plant applications of Oxamyl and Ethoprop suppressed levels of P. coffeae in the soil about and roots of the yellow yam plants. Applications of Oxamyl resulted in significantly less dry rotting of harvested tubers thus enhancing the suitability of these tubers as planting material.

The authors recommend that the Ministry of Agriculture or a designated agency establish pilot schemes in the major yam-growing areas for the purpose of disinfecting yam planting material, preferably with Oxamyl. We further recommend the establishment of large-scale field trials designed to assess the economic benefits of disinfested planting material. These actions followed by the deployment of an agency to provide "clean" yam planting material are seen as imperative if increased production and productivity of yams are to be realised in Jamaica.

The first part of the document
 discusses the importance of
 maintaining accurate records
 and the role of the
 committee in this regard.

It is noted that the
 committee has been
 working on this matter
 for some time and
 has made significant
 progress.

The committee has
 also been
 consulted by
 various groups
 and individuals
 who have expressed
 their views on the
 subject.

In conclusion, the
 committee believes
 that the findings
 of this study
 will be of great
 value to the
 organization.

TABLE 1. - Earliness of sprouting of yellow yam (*Dioscorea cayenensis*) planting material (heads) and growth and development of plants in a trial to investigate *inter alia*, critical levels of dry rotting and the benefits of disinfecting the heads of *Pratylenchus coffeae*

| TREATMENTS | Sprouting after planting (%) | | | | | Plant height (m) | | | Leaf width (cm) | |
|-----------------------------------------------------------------------------|------------------------------|------|------|-------|-------|------------------|------|-------|-----------------|----------------|
| | 6 wk | 7 wk | 9 wk | 11 wk | 22 wk | 6 wk | 9 wk | 11 wk | 6 wk 1st node | 17 wk 2nd node |
| Heavily dry-rotted ^a heads disinfecting with Oxamyl ^c | 20 | 43 | 72 | 91 | 99 | 0.42 | 1.23 | 1.90 | 6.7 | 13.5 |
| Heavily dry-rotted ^a undisinfested heads | 15 | 27 | 64 | 77 | 92 | 0.38 | 0.90 | 1.68 | 6.4 | 12.9 |
| Lightly dry-rotted ^b heads disinfecting with Oxamyl ^c | 35 | 51 | 88 | 97 | 99 | 0.29 | 1.12 | 1.99 | 6.6 | 13.6 |
| Lightly dry-rotted ^b undisinfested heads | 40 | 58 | 90 | 96 | 99 | 0.38 | 1.32 | 2.22 | 6.9 | 13.5 |
| LSD 5% | 9.0 | 10.7 | 8.3 | 9.4 | - | - | - | 0.37 | - | 0.56 |

- a More than 66% of surface of head affected by the dry rot and depth of rot 4 - 11.5 mm (avg. 6.6 mm).
- b Less than 15% of surface of head affected by the dry rot and depth of rot 1 - 2 mm (avg. 1.5 mm).
- c Dipped for 40 min in a 1500 ppm solution.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for a systematic approach to data collection and the importance of using reliable sources of information.

3. The third part of the document focuses on the role of technology in data management. It discusses how modern software solutions can help streamline data collection, storage, and analysis processes, making them more efficient and accurate.

4. The fourth part of the document addresses the challenges associated with data management. It identifies common issues such as data quality, security, and privacy, and provides strategies to mitigate these risks.

5. The fifth part of the document discusses the importance of data security and privacy. It emphasizes the need for robust security measures to protect sensitive information from unauthorized access and data breaches.

6. The sixth part of the document focuses on the role of data in decision-making. It explains how data-driven insights can help organizations make more informed and strategic decisions, leading to improved performance and growth.

7. The seventh part of the document discusses the importance of data governance. It outlines the key principles and practices of data governance, including data ownership, access control, and data lifecycle management.

8. The eighth part of the document addresses the future of data management. It explores emerging trends and technologies that will shape the way data is collected, stored, and analyzed in the coming years.

9. The ninth part of the document discusses the importance of data literacy. It emphasizes the need for all employees to have a basic understanding of data and how to use it effectively in their work.

10. The tenth part of the document provides a conclusion and summarizes the key points discussed throughout the document. It reiterates the importance of data management and the need for a comprehensive and integrated approach to data collection, storage, and analysis.

TABLE 2. - Numbers of *Pratylenchus coffeae* found in soil about, roots of and skin of tubers borne by yellow yam (*Dioscorea cayenensis*) plants in a trial investigating critical levels of dry rotting of planting material (heads), the benefits of disinfecting the heads and the use of post-plant nematicide treatments

| TREATMENTS | | NUMBERS OF P. COFFEAE | | | |
|-----------------------------------------------------------------------------|-----------------------|-----------------------|----------------|--------------------|----------------------|
| Before planting | After planting | At 39 weeks | | At harvest (47 wk) | |
| | | Per 100 ml soil | Per 10 gm root | Per 100 ml soil | Per 10 gm tuber skin |
| Heavily dry-rotted ^a heads disinfecting with Oxamyl ^c | Ethoprop ^d | 17 | 20 | 19 | 70 |
| | Oxamyl ^e | 3 | 160 | 21 | 40 |
| | None | 90 | 1270 | 20 | 110 |
| Heavily dry-rotted ^a undisinfected heads | Ethoprop ^d | 3 | 30 | 8 | 50 |
| | Oxamyl ^e | 1 | 200 | 9 | 60 |
| | None | 20 | 290 | 23 | 80 |
| Lightly dry-rotted ^b heads disinfecting with Oxamyl ^c | Ethoprop ^d | 3 | 30 | 25 | 80 |
| | Oxamyl ^e | 5 | 340 | 2 | 40 |
| | None | 73 | 2250 | 26 | 90 |
| Lightly dry-rotted ^b undisinfected heads | Ethoprop ^d | 3 | 90 | 5 | 70 |
| | Oxamyl ^e | 3 | 330 | 27 | 100 |
| | None | 130 | 860 | 29 | 80 |
| LSD 5% | | 62 | 795 | - | - |

a More than 66% of surface area of head affected by the dry rot and depth of rot 4 - 11.5 mm (avg. 6.6 mm) .

b Less than 15% of surface area of head affected by the dry rot and depth of rot 1 - 2 mm (avg. 1.5 mm) .

c Dipped for 40 min in a 1500 ppm solution.

d 13.9 kg ai/ha of Ethoprop 10G at 11, 22 and 33 weeks.

e 12.2 kg ai/ha of Oxamyl 10G at 11, 22 and 33 weeks.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. This section also touches upon the legal implications of failing to maintain such records, which can lead to severe consequences for individuals and organizations alike.

2. The second part of the document delves into the specific requirements for record-keeping, including the types of records that must be maintained, the frequency of updates, and the methods used to store and retrieve these records. It provides a detailed overview of the various types of records, such as financial statements, contracts, and correspondence, and explains how they should be organized and managed to ensure easy access and accuracy.

3. The third part of the document focuses on the role of technology in record-keeping. It discusses the benefits of using digital tools and software to manage records, such as increased efficiency, reduced risk of loss, and improved security. It also addresses the challenges associated with digital record-keeping, such as data migration and the need for robust backup and recovery plans.

4. The fourth part of the document provides a comprehensive guide to the legal and regulatory requirements for record-keeping. It covers the various laws and regulations that govern record-keeping practices, including those related to data privacy, financial reporting, and industry-specific regulations. It also provides practical advice on how to ensure compliance with these requirements, including the importance of staying up-to-date on changes in the law and the need for regular audits.

5. The fifth and final part of the document offers a summary of the key points discussed throughout the document. It reiterates the importance of maintaining accurate records and provides a checklist of the most critical record-keeping practices. It also offers some final thoughts on the future of record-keeping, including the potential impact of emerging technologies and the need for continued vigilance in this area.

TABLE 3. - Qualitative and gross tuber yields of yellow yam (*Dioscorea cayenensis*) in a trial to investigate critical levels of dry rotting of planting material (heads) and the benefits of disinfecting the heads of *Pratylenchus coffeae* at planting followed by post-plant nematicide treatments

| TREATMENTS | | Bearing plants (%) | Level of dry rotting ^f on tubers | Tuber yields per plot planted with 10 heads (kg) | | |
|-----------------------------------------------------------------------------|-----------------------|--------------------|---------------------------------------------|--------------------------------------------------|-------|------------|
| Before planting | After planting | | | Total | Heads | Marketable |
| Heavily dry-rotted ^a heads disinfecting with Oxamyl ^c | Ethoprop ^d | 94 | 3.2 | 40.93 | 11.93 | 25.27 |
| | Oxamyl ^e | 94 | 2.9 | 41.27 | 10.83 | 25.53 |
| | None | 94 | 3.7 | 41.97 | 11.80 | 21.33 |
| Heavily dry-rotted ^a undisinfested heads | Ethoprop ^d | 86 | 3.5 | 37.60 | 9.60 | 21.73 |
| | Oxamyl ^e | 78 | 2.6 | 29.30 | 9.03 | 17.57 |
| | None | 81 | 3.4 | 33.47 | 10.93 | 13.60 |
| Lightly dry-rotted ^b heads disinfecting with Oxamyl ^c | Ethoprop ^d | 94 | 3.0 | 38.70 | 11.10 | 24.90 |
| | Oxamyl ^e | 100 | 3.1 | 50.33 | 12.90 | 30.37 |
| | None | 100 | 3.3 | 46.10 | 12.13 | 27.80 |
| Lightly dry-rotted ^b undisinfested heads | Ethoprop ^d | 90 | 3.7 | 35.60 | 11.47 | 21.80 |
| | Oxamyl ^e | 94 | 3.5 | 41.97 | 13.00 | 26.00 |
| | None | 94 | 4.3 | 37.47 | 12.17 | 20.40 |
| LSD 5% | | 9.4 | 0.7 | 10.40 | - | - |

a More than 66% of surface of head affected by the dry rot and depth of rot 4 - 11.5 mm (avg. 6.6 mm) .

b Less than 15% of surface of head affected by the dry rot and depth of rot 1 - 2 mm (avg. 1.5 mm) .

c Dipped for 40 min in a 1500 ppm solution.

d 13.9 kg ai/ha of Ethoprop 10G at 11, 22 and 33 weeks.

e 12.2 kg ai/ha of Oxamyl 10G at 11, 22 and 33 weeks.

f Dry rotting rated on a 1-5 scale where 1,2,3,4 and 5 = 1-20%, 21-40%, 41-60%, 61-80%, and 81-100%, respectively of the head's surface having the dry rot.

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REFERENCES

1. Coates-Beckford, P. L. 1978. In: Investigations 1976. Bull. No. 66 (New Series), Min. of Agric., Jamaica. pp 52-59
2. Coates-Beckford, P. L. and C.W.D. Brathwaite. 1977. Nematropica 7 (2): 20-26.
3. Coates-Beckford, P. L., D. G. Hutton and A. G. Jones. 1978. Nematropica 8 (2): 6-7 (Abstr).
4. Degras, L. and P. Mathurin. 1980. In: A Newsletter for Research on Yam. International Seminar on Yam. INRA, Petit-Bourg, Guadeloupe. pp 27-28 (Abstr).
5. Hutton, D. G. 1979. In: Investigations 1977/1978. Bull. No. 67 (New Series), Min. of Agric., Jamaica. pp 23-48.
6. Hutton, D. G. In: Investigations 1978. Bull. No. 68 (New Series), Min. of Agric., Jamaica. In Press.
7. Hutton, D. G. In: Investigations 1979. Bull. No. 69 (New Series), Min. of Agric., Jamaica. In Press.
8. Nwankiti, A. O. and O. B. Arene 1978. PANS 24 (4): 486-494.

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- No. III - 4 IICA Jamaica Staff, "Agro-Socio-Economic Sample Survey of Allsides - Trelawny, Jamaica", September 1979

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry must be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author details the various methods used to collect and analyze the data. This includes both manual and automated processes. The goal is to ensure that the information is both reliable and up-to-date.

The third part of the document focuses on the results of the analysis. It shows that there has been a significant increase in sales over the period covered. This is attributed to several factors, including improved marketing strategies and better customer service.

Finally, the document concludes with recommendations for future actions. It suggests that the company should continue to invest in its marketing efforts and maintain its high standards of service. This will help to ensure long-term success and growth.

- No. III - 5 IICA-MOAJ, "An Approach to Agricultural Settlement of Hilly Lands", October 1979
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- No. III - 7 Canute McLean, "Production and Marketing of Peanuts", November 1979

1980

- No. IV - 1 Joseph Johnson, "Production and Marketing of Red Peas in the Hilly Areas of Jamaica", January 1980
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- No. IV - 5 Glenys H. Barker, "Bibliography of Literature relating to Research and Development in the Agricultural Sector of Jamaica 1959 - 1979", March 1980
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- No. IV - 11 IICA/Jamaica "Pilot Hillside Agricultural Project" (PHILAGRIP), Project Document. Vols. I, II and III, June 1980.
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- No. IV - 17 P. Aitken, A. Wahab, I. Johnson, A. Sahney and N. Munguia, "Rural Women Survey", Vols. I, II and III, October 1980.
- No. IV - 18 P. Aitken, I.E. Johnson, A. Wahab, "Assessment of Employment Among Small Hillside Farmers of Jamaica", November 1980.
- No. IV - 19 IICA/Jamaica "Pilot Hillside Agricultural Project", (PHILAGRIP), Final Project Document. October 1980.
- No. IV - 20 P. Aitken, A. Wahab, I.E. Johnson, Bo-Myeong Woo, "IICA Evaluation of the First Phase FSB Allsides Project", (Internal Document of Work), November 1980.
- No. IV - 21 MINAG/IICA/CARDI - "Seminar on Multiple Cropping", December 1980

1981

- No. V - 1 N. Munguia, P. Aitken, A. Wahab, I. Johnson, "Smoke Curing of Fish (as a household industry in Rural Jamaica)", January 1981.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to support effective decision-making.

3. The third part of the document focuses on the role of technology in modern data management. It discusses how advanced software solutions can streamline data collection, storage, and analysis, leading to more efficient and accurate results.

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5. The fifth part of the document explores the importance of data quality and integrity. It discusses strategies for identifying and correcting errors in data collection and analysis to ensure the reliability of the information used for decision-making.

6. The sixth part of the document discusses the role of data in strategic planning and performance management. It highlights how data-driven insights can help organizations identify trends, opportunities, and areas for improvement, leading to more informed and effective strategic decisions.

7. The seventh part of the document provides a summary of the key findings and recommendations. It emphasizes the need for a comprehensive and integrated approach to data management that encompasses all aspects of the organization's operations.

8. The eighth part of the document includes a list of references and sources used in the research. It provides a clear and concise list of the literature and resources that informed the analysis and conclusions presented in the document.

9. The ninth part of the document includes a list of appendices and supplementary materials. These materials provide additional details and data that support the findings and conclusions of the document.

10. The tenth part of the document includes a list of figures and tables. These visual elements help to present complex data in a clear and accessible format, making it easier for readers to understand the key findings and trends.

- No. V - 2 P. Aitken, A. Wahab, I. Johnson, "Under-employment - It's Relation to the Agricultural Sector and Considerations for its Management", January 1981
- No. V - 3 D. D. Henry, J. R. Gayle, "The Culture of Grafted Pimento (as spice crop for Allsides, Jamaica)", January 1981
- No. V - 4 Abdul H. Wahab, Noel Singh, "Agricultural Research in Jamaica", February 1981
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- No. V - 10 Elaine Montague-Gordon, Abdul H. Wahab, Joseph Dehaney and Audrey Wright, "Performance of Eleven Varieties of Dry Beans (Phaseolus vulgaris) Over Two Successive Seasons on the Hillsides of Jamaica", August 1981
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- No. V - 13 Bo-Myeong Woo, Abdul H. Wahab, Joseph Dehaney, "Crop Production on Hillsides using non-Bench Terracing Alternative Measures for Soil Conservation (first year's results of the Olive River Soil Conservation studies)", September 1981
- No. V - 14 Abdul H. Wahab, Percy Aitken-Soux, Irving E. Johnson, Bo-Myeong Woo, Howard Murray and Joseph Dehaney, "Agricultural Production on Hillsides - the Allsides Project Case Study", September 1981
- No. V - 15 D. G. Hutton, A. H. Wahab and J. Dehaney, "Investigating Critical Levels of Dry Rotting of Yellow Yam (Dioscorea Cayenensis) Planting Material, the Benefits of Disinfesting the Heads of Pratylenchus Coffeae and of After-Planting Nematicide Treatments", September 1981



