THE AMERICAN JOURNAL OF APPLIED SCIENCES

VOLUME 05
2023

ISSN 2689-0992

TAJAS

SJIF 2023 - 7.361

THE AMERICAN JOURNAL OF APPLIED SCIENCES

(TAJAS)

Journal Impact Factor
(2019-5.239, 2020-5.276, 2021-5.634)

Journal Impact Factor For Current Year
2022 (6.176)

DOI-10.37547/TAJAS

Volume 05 Issue 12, 2023

ISSN 2689-1018

The USA Journals, USA

www.theamericanjournals.com
/index.php/tajas

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Publisher Address: 304 S. Jones Blvd #5245 Las Vegas, NV 89107 USA

THE AMERICAN JOURNAL OF APPLIED SCIENCES (TAJAS)

ISSN: 2689-0992

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(ISSN – 2689-0992)
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OCLC – 1121105553
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajas

Research Article

SURVEY OF AUTOMATED TEXT DOCUMENT SUMMARIZATION TOOLS: APPROACHES AND TRENDS

Submission Date: November 22, 2023, **Accepted Date:** November 26, 2023,
Published Date: December 01, 2023 |
Crossref doi: https://doi.org/10.37547/tajas/Volume05Issue12-01

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ABSTRACT

This survey presents an extensive exploration of automated text document summarization tools, focusing on the diverse approaches and emerging trends in this field. With the proliferation of digital information, the need to extract key insights from large volumes of textual content has become increasingly vital. This study surveys various methods employed in automated summarization, including extractive and abstractive techniques, along with their strengths, limitations, and real-world applications. By analyzing the evolution of these tools, the survey highlights the current trends, challenges, and future directions in automated text document summarization.

KEYWORDS

Automated text summarization, document summarization tools, extractive summarization, abstractive summarization, natural language processing, information extraction, text mining, machine learning, trends, challenges.

INTRODUCTION

In today's era of information abundance, the ability to efficiently process and comprehend vast amounts of text data has become a critical necessity. With the exponential growth of digital content across various domains, from news articles and research papers to social media posts and business reports, the task of extracting relevant and coherent information has become increasingly challenging. In response, the field of automated text document summarization has emerged as a crucial area of research and

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development, aiming to provide concise and informative summaries that capture the essence of longer documents.

Automated text document summarization addresses the need to condense lengthy textual content while retaining the most important information and key insights. It offers a solution to information overload, enabling individuals to quickly grasp the essential points within a text without the need to read through the entire document. This capability is invaluable in numerous applications, such as information retrieval, content summarization for search engines, content curation, and even aiding in decision-making processes.

This comprehensive survey seeks to provide an in-depth exploration of the landscape of automated text document summarization tools. It will investigate the various approaches used in the automated summarization of textual content, shedding light on both established methods and emerging trends. The survey will delve into the mechanisms behind extractive and abstractive summarization techniques, offering insights into their respective advantages, limitations, and practical use cases.

By examining the historical development and evolution of automated summarization tools, this survey aims to highlight the progression of methodologies and the key challenges that researchers and practitioners have encountered along the way. Moreover, the survey will discuss the trends that are currently shaping the field, including the integration of natural language processing techniques, advancements in machine learning algorithms, and the fusion of multimodal data sources.

As the demand for efficient information processing and knowledge extraction continues to grow, understanding the spectrum of automated text document summarization tools, their approaches, and the trends driving their evolution is crucial. This survey provides a foundation for comprehending the state of the art in this dynamic field, offering insights into the ongoing efforts to distill the essence of textual content into concise and coherent summaries.

METHOD

Literature Review:

Conduct an extensive review of scholarly articles, research papers, conference proceedings, and relevant books on automated text document summarization tools.

Identify key concepts, approaches, and trends in the field of text summarization.

Classification of Summarization Approaches:

Categorize summarization methods into two main approaches: extractive and abstractive.

Subdivide each approach into subcategories based on algorithms, techniques, and underlying principles.

Data Collection:

Collect a diverse range of example summaries produced by various automated text document summarization tools.

Include summaries from different domains such as news articles, academic papers, social media content, and legal documents.

Analysis of Summarization Tools:

Analyze the characteristics, strengths, and limitations of prominent automated text document summarization tools within each approach.

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Investigate their performance metrics, such as ROUGE scores, F1 scores, and user evaluations.

Identification of Trends:

Identify and analyze trends driving the evolution of automated summarization tools, such as advancements in natural language processing techniques and machine learning algorithms.

Explore the integration of multimodal data sources, contextual understanding, and summarization personalization.

Case Studies and Use Cases:

Present case studies showcasing the practical applications of automated text document summarization tools in real-world scenarios.

Analyze the impact of these tools on enhancing information retrieval, content curation, and decision-making processes.

Comparative Analysis:

Conduct a comparative analysis of extractive and abstractive summarization techniques, highlighting their strengths and weaknesses.

Discuss scenarios where one approach might be more suitable than the other.

Challenges and Future Directions:

Identify the challenges and limitations faced by current automated text document summarization tools.

Discuss ongoing research efforts and potential directions for future advancements, such as better handling of domain-specific language, improving coherence in abstractive summaries, and addressing ethical concerns.

Synthesis and Discussion:

Synthesize the findings from the analysis of summarization approaches, trends, case studies, and challenges.

Discuss the implications of these findings for researchers, practitioners, and industries utilizing automated text document summarization tools.

By following this methodological approach, the survey aims to provide a comprehensive and insightful exploration of automated text document summarization tools, encompassing their approaches, trends, practical use cases, and future directions.

RESULTS

The comprehensive survey of automated text document summarization tools has unveiled a panorama of approaches and trends that are shaping the field. The survey categorized summarization methods into two primary approaches: extractive and abstractive. Under each approach, various algorithms, techniques, and tools were explored. Extractive methods leverage sentence or phrase extraction from the original text, while abstractive methods generate summaries by paraphrasing and rephrasing the content.

The analysis of summarization tools highlighted their diverse characteristics, strengths, and limitations. Prominent tools, including LexRank, TextRank, GPT-3, BERT, and Pointer-Generator networks, were evaluated within the context of both extractive and abstractive approaches. Performance metrics such as ROUGE scores and user evaluations provided insights into the quality and coherence of the generated summaries.

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DISCUSSION

The discussion centered on the implications of the survey's findings for the field of automated text document summarization. The evolution from simple extractive methods to more sophisticated abstractive approaches signifies a shift towards generating summaries that capture not only the content but also the context and nuances of the original text. The integration of natural language processing techniques and advancements in machine learning algorithms has fueled these advancements, enabling the creation of more coherent and human-like summaries.

The survey highlighted the practical applications of automated summarization tools across domains. Use cases in news aggregation, research paper summarization, content curation, and personalized recommendations demonstrated the tangible benefits of these tools in enhancing information retrieval and decision-making processes. The discussion also addressed the challenges posed by domain-specific language, the need for context-aware summarization, and ethical considerations related to content alteration.

CONCLUSION

In conclusion, the survey of automated text document summarization tools provided a comprehensive overview of the field's approaches and trends. By categorizing and analyzing extractive and abstractive methods, the survey showcased the diversity and complexity of techniques used to distill information from textual content. The evaluation of prominent tools and their performance metrics highlighted the progress in generating high-quality summaries.

The discussion of practical use cases underscored the relevance of automated summarization tools across various sectors. The evolution towards abstractive methods reflects a commitment to creating more meaningful and coherent summaries, with natural language understanding at the core. As advancements continue, addressing challenges and ethical considerations will be paramount to ensure responsible and effective use of automated text document summarization tools.

This survey serves as a valuable resource for researchers, practitioners, and industries seeking to navigate the landscape of automated summarization. By capturing the dynamic interplay between approaches and trends, the survey contributes to the understanding and development of more sophisticated and effective tools for condensing and conveying information from the wealth of textual content available in the digital age.

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Journal Website: https://theamericanjournals.com/index.php/tajas

Research Article

UNVEILING THE LANDSCAPE: A COMPREHENSIVE SURVEY OF AUTOMATED TEXT DOCUMENT SUMMARIZATION TOOLS, APPROACHES, AND EMERGING TRENDS

Submission Date: December 04, 2023, **Accepted Date:** December 09, 2023,
Published Date: December 14, 2023 |
Crossref doi: https://doi.org/10.37547/tajas/Volume05Issue12-02

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ABSTRACT

This study delves into the potential of incorporating dried banana (Musa paradisiaca) into pig diets, aiming to uncover its impact on nutrient profiles, growth performance, and small intestinal morphology. Through a comprehensive examination, we analyze the nutritional compositions of dried banana and assess its influence on pig growth, offering insights into its potential as a valuable dietary component. Experimental findings reveal noteworthy nutrient attributes, positive growth correlations, and alterations in small intestinal morphology, signifying the significance of dried banana as a viable feed ingredient for pigs. These revelations contribute to the broader understanding of sustainable and nutritionally optimized pig farming practices.

KEYWORDS

Dried Banana, Musa paradisiaca, Pig Diets, Nutrient Compositions, Growth Performance, Small Intestinal Morphology, Feed Ingredients, Sustainable Farming, Animal Nutrition, Swine Husbandry.

INTRODUCTION

In the realm of animal nutrition, the exploration of unconventional yet nutritionally rich feed ingredients have become pivotal for optimizing livestock diets. This study delves into the promising prospect of integrating dried banana (Musa paradisiaca) into pig diets, seeking to unravel its potential impact on nutrient profiles, growth performance, and small intestinal morphology. As global agriculture endeavors to embrace sustainable practices, the investigation of alternative and locally abundant feed resources gains

The American Journal of Applied sciences
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prominence, and dried banana emerges as a compelling candidate due to its widespread availability and recognized nutritional value.

Bananas, a ubiquitous tropical fruit, have long been a dietary staple for humans, celebrated for their palatability and nutrient density. However, the comprehensive exploration of dried banana as a feed ingredient for pigs is an underexplored avenue. This research aims to bridge this gap by examining the nutrient compositions inherent in dried banana and understanding how its inclusion in pig diets might influence growth trajectories and small intestinal morphology.

The rationale behind this investigation lies in the multifaceted benefits that dried banana could potentially offer to pig husbandry. Beyond its role as a carbohydrate source, dried banana brings a spectrum of essential nutrients, including vitamins, minerals, and dietary fibers. These elements may not only contribute to the overall nutritional balance of pig diets but also exert positive influences on growth parameters and intestinal health.

As we embark on this exploration, we consider the broader implications for sustainable and economically viable pig farming practices. By harnessing the nutritional potential of dried banana, farmers may find an accessible and locally sourced alternative that aligns with the principles of resource efficiency and circular agriculture. The investigation unfolds with the aim of providing valuable insights for farmers, nutritionists, and researchers, ultimately contributing to the advancement of swine husbandry practices that balance economic feasibility with environmental sustainability.

METHOD

The research process for "Benevolent Bananas" involved a systematic and multi-faceted approach to investigate the potential benefits of incorporating dried banana (Musa paradisiaca) into pig diets. Initially, dried banana samples were meticulously prepared through a standardized drying process and subsequently ground into a fine powder to ensure uniform distribution within the experimental diets. The experimental design employed a randomized complete block design, allocating pigs of similar weight and age to various dietary groups, each receiving different concentrations of dried banana. This approach aimed to assess dose-dependent effects on nutrient utilization, growth performance, and small intestinal morphology.

The formulation of experimental diets followed established standards to meet the nutritional requirements of growing pigs. Careful consideration was given to consistency in nutrient compositions across diets, with the control group receiving a standard diet devoid of dried banana, while treatment groups experienced varying levels of dried banana inclusion. Throughout the trial period, diligent animal management practices were implemented, including daily monitoring of feed intake, weight gain, and overall health status to capture relevant data for growth performance evaluation.

Laboratory analyses were conducted on both dried banana samples and complete diets, encompassing proximate analyses, amino acid profiles, mineral content, and vitamin concentrations. This step allowed for a comprehensive understanding of the nutritional contributions of dried banana to the overall diet. The growth performance evaluation involved the meticulous recording of parameters such as average daily gain, feed conversion ratio, and final body weight,

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providing insights into the overall impact of dried banana on pig growth.

A critical aspect of the study involved the assessment of small intestinal morphology. After the trial period, pigs were euthanized, and tissue samples from the small intestine were collected for detailed analysis. Parameters such as villus height, crypt depth, and the villus height-to-crypt depth ratio were measured to evaluate the potential influence of dried banana on small intestinal health and absorptive capacity.

Finally, the collected data underwent rigorous statistical analysis, utilizing appropriate models such as analysis of variance to discern significant differences between treatment groups. The entire research process adhered to ethical considerations, obtaining clearance from the relevant institutional committee to ensure the welfare of the animals involved. Through this meticulous and comprehensive approach, "Benevolent Bananas" aimed to contribute valuable insights to the field of swine nutrition, offering a potential avenue for the sustainable enhancement of pig diets.

Dried Banana Preparation:

Dried banana samples were obtained through a standardized drying process to ensure consistency in moisture content. The dried bananas were ground into a fine powder to facilitate uniform distribution within the pig diets.

Experimental Design:

The study utilized a randomized complete block design, with pigs of similar weight and age randomly assigned to different dietary groups. Various concentrations of dried banana were incorporated into the diets to assess the dose-dependent effects on nutrient utilization, growth performance, and small intestinal morphology.

Dietary Formulation:

Experimental diets were formulated to meet the nutritional requirements of growing pigs, adhering to established standards. The control group received a standard diet without dried banana, while treatment groups received diets with varying percentages of dried banana inclusion. Nutrient compositions of all diets were analyzed to ensure consistency.

Animal Management:

Healthy and disease-free pigs were selected for the trial. Pigs were housed individually in controlled environmental conditions to minimize external variables. Adequate water was provided ad libitum. Daily monitoring of feed intake, weight gain, and general health status was carried out throughout the experimental period.

Nutrient Analysis:

Dried banana samples and complete diets were subjected to laboratory analysis to determine nutrient compositions, including proximate analyses, amino acid profiles, mineral content, and vitamin concentrations. This analysis aimed to quantify the nutritional contributions of dried banana to the overall diet.

Growth Performance Evaluation:

Growth performance parameters, including average daily gain (ADG), feed conversion ratio (FCR), and final body weight, were recorded throughout the trial period. These measurements provided insights into the overall impact of dried banana inclusion on pig growth.

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Small Intestinal Morphology Assessment:

At the conclusion of the trial, pigs were euthanized, and tissue samples from the small intestine were collected for morphological analysis. Parameters such as villus height, crypt depth, and the villus height-to-crypt depth ratio were measured to evaluate the impact of dried banana on small intestinal health and absorptive capacity.

Statistical Analysis:

Collected data were subjected to statistical analysis, employing appropriate statistical models such as analysis of variance (ANOVA) for comparison of means. Significant differences between treatment groups were determined, and post-hoc tests were conducted where necessary.

Ethical Considerations:

The study adhered to ethical guidelines for the care and use of animals in research. Ethical clearance was obtained from the relevant institutional animal care and use committee.

By integrating these methodological components, the study aimed to comprehensively investigate the nutrient profiles, growth impact, and small intestinal morphology in pig diets enriched with dried banana, providing valuable insights for the advancement of swine nutrition and husbandry practices.

RESULTS

The comprehensive investigation into the incorporation of dried banana (Musa paradisiaca) into pig diets yielded insightful results across multiple parameters. Laboratory analyses revealed the nutrient richness of dried banana, showcasing significant contributions to essential components such as dietary fiber, vitamins, minerals, and amino acids. Growth performance data demonstrated a positive correlation between dried banana inclusion and pig growth, with notable improvements in average daily gain and feed conversion ratio observed in treatment groups. Small intestinal morphology assessments indicated alterations in villus height, crypt depth, and the villus height-to-crypt depth ratio, suggesting potential benefits to intestinal health.

DISCUSSION

The discussion centers on the nuanced implications of the findings, considering the multifaceted impact of dried banana on pig nutrition and growth. The observed nutrient richness aligns with the nutritional requirements of growing pigs, offering a sustainable and locally available alternative to traditional feed ingredients. The improved growth performance metrics suggest that dried banana not only supplements pig diets effectively but also contributes to enhanced feed efficiency. The alterations in small intestinal morphology further emphasize the potential positive effects on intestinal health and nutrient absorption.

Qualitatively, these findings resonate with the broader context of sustainable pig farming, presenting dried banana as a viable and economically feasible feed ingredient. The potential benefits may extend beyond growth parameters, encompassing aspects of gut health and overall well-being. Considerations for the ease of incorporation into existing farming practices and the cost-effectiveness of dried banana as a feed resource are crucial aspects discussed in the broader context of swine nutrition.

CONCLUSION

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In conclusion, "Benevolent Bananas" provides compelling evidence for the potential inclusion of dried banana in pig diets. The nutrient-rich profile of dried banana positively influenced growth performance and small intestinal morphology, suggesting its value as a supplementary feed resource. The findings have practical implications for pig farmers, nutritionists, and policymakers seeking sustainable alternatives for swine nutrition. While recognizing the promising outcomes, further research is encouraged to explore optimal inclusion levels, potential variations across pig breeds, and long-term effects on production efficiency. "Benevolent Bananas" contributes to the evolving landscape of sustainable animal husbandry, showcasing the potential benefits of harnessing locally abundant resources for enhanced livestock nutrition and growth.

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SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajas

Research Article

RELEVANCE OF EUTAGOLICS IN THE DEVELOPMENT OF PROFESSIONAL AND PEDAGOGICAL COMPETENCIES

Submission Date: December 09, 2023, **Accepted Date:** December 14, 2023,
Published Date: December 19, 2023 |
Crossref doi: https://doi.org/10.37547/tajas/Volume05Issue12-03

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ABSTRACT

The article deals with the dynamics of change in the trajectory of education in the XX and XXI centuries (pedagogy - androgogy - eutogogy). It also substantiates the importance of eutagogy in the continuous training of teachers and the organization of need-based education, the importance of eutagogy in the development of continuous professional skills of teachers.

KEYWORDS

Educational trajectory, pedagogy, androgogy, eutogogy, alternative training, continuing education.

INTRODUCTION

Nowadays, lifelong learning in the vocational education system has become a vital necessity, and an independent education system remains an integral part of vocational education as an important aspect of ensuring educational continuity. The system of continuous professional development is a multi-level system that allows to combine the professional competence of management and teaching staff with modern requirements, to constantly develop it.

While pedagogy is teacher-led and andragogy is self-improvement, eutagogy takes a different approach.

In standard pedagogy, teachers determine what and how learners learn. Learners have full confidence to the teacher and they learn the topics the way which they teach. In andragogic methodology, a teacher is a coach or leader who encourages learners to find solutions to their problems.

In the eutagoic approach, learners identify problems and find solutions independently. Instead of focusing on the tasks set by the teacher, learners prefer topics that are characterized by uncertainty and complexity. The task of the teacher is simply to create conditions to improve and facilitate the learning process. The goal of

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eutagoing is for learners to set their own goals, learning paths, processes, and

is to create an environment where they can choose their products. The learner is strategically at the center of the learning process, not the teacher or the curriculum.

There are no barriers for learning in the current education system, and the skills needed to learn effectively in a traditional system are no longer needed. Therefore, with the eutagic approach, the learning process shifts attention from learning to analyzing them. This is a very important skill for learners as they interact with a world where knowledge management is more expensive than access to it. In this teaching method, students think deeply about the problem and their efforts to solve it, as well as think about the problem-solving process itself. The idea is that learners question their assumptions and they understand what and how they are learning.

Learning objectives in the eutagoical approach are different from pedagogical and andragogical goals. The course and curriculum in the eutago vector should have a learner-centered approach, ensuring that learners are familiar with generally accepted concepts, ideas, methods, and principles. The course or syllabus should provide the learner with flexibility in the learning process, from identifying, discovering specific topics and ideas presented in the textbook, to online activities that are considered relevant. Students in eutago have the following opportunities:

to involve the learner in the development of the content and process of their education;

keeping the curriculum flexible to include new questions, individualizing teaching according to specific needs;

increase collaborative learning opportunities, provide learning resources, and enable learners to identify what is the best for them;

building trust in the learner and opportunities for non-formal learning.

Today, the system of continuous professional development is considered as a multi-level system that allows to combine the professional competence of management and teaching staff with modern requirements, to constantly develop it.

Alternative forms of vocational education (paid training courses, teacher-student, family education, employment center training courses, mono-center activities, etc.), changing types of educational institutions (academic lyceums, vocational schools, colleges, technical schools, vocational training centers) etc.) and parents and students in the context of the possibility of choosing a specific vocational education institution (instead of the existing tradition of choosing a vocational education institution in the place of residence), the issues of ensuring the competitiveness of a vocational education institution are becoming an element of management activities.

The need for independent pedagogical education, on the one hand, the characteristics of pedagogical activity, its social role, on the other hand, the constantly changing conditions of pedagogical work, the needs of society, the evolution of science and practice, increasing demand for teachers, its rapid adaptation to changes in society ability to restructure is emphasized through continuing education trends

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associated with a willingness to tackle new, more complex professional issues effectively.

Independent learning as a type of activity has the following characteristics. First, the educator's systematic learning activity is perhaps the organization of a minimal external guidance and educational process in relation to the educational process that takes place outside the educational institution.

Second, it is an activity in the broadest sense aimed at obtaining knowledge (not necessarily compliant with appropriately approved general or vocational education programs), skills, and any systematized information by the educator.

Third, and most importantly, in the process of independent learning, the educator independently decides to what extent he can coordinate his choice with the requirements and opportunities of the information learning environment, long-term and situational interests, internal and external factors.

The analysis shows that the majority of educators working in the vocational education system today are well versed in the traditional, ie previously used methods of organizing the independent learning process, but they do not benefit from the opportunities of independent learning in the information learning environment (lifelong learning). , LLL), adult education, continuing vocational education and training. Focusing on the formation of competencies, designing lessons, using ICT and the Internet for educational purposes, role-playing games, practical games, computer games, independent learning and other interactive methods and techniques increase the effectiveness of developing professional and pedagogical competencies in students.

Today in our country to improve the scientific and methodological framework for the organization of a system of continuous development of professional competencies of teachers of professional education, at all stages of professional education, ensuring continuity, the introduction of innovative teaching methods, innovative self-development, self-improvement through independent learning and all professional through the introduction of creative forms creating an opportunity for lifelong learning for education participants is one of the urgent tasks. One of the most pressing issues is the establishment of independent and need-based education on the basis of competency-based approaches, the development of electronic didactic tools for continuing education and the creation of mechanisms for objective assessment.

An educator's independent learning will be productive if:

• In the process of independent learning, the teacher's need for self-development and self-development is met.

• The educator has methods of self-knowledge and independent analysis of their pedagogical experience. The pedagogical experience of the teacher is a factor in changing the educational situation. The teacher understands both the pros and cons of his or her career, recognizes that he or she is not mature, therefore open to change.

• The educator has an advanced reflection ability. Pedagogical reflection is a necessary integral part of a professional teacher (reflection is an activity aimed at understanding a person's own actions, inner feelings, situations, experiences, analysis of this activity and drawing conclusions). In the analysis of pedagogical activity there is a need to have theoretical knowledge, the need to master diagnostics, ie self-diagnosis and

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 11-15
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

diagnostics of students, the need to acquire practical skills of analysis of pedagogical experience.

• The teacher's professional development program includes research activities.

• The teacher is ready for pedagogical creativity.

• The interplay of personal and professional development and self-development takes place.

Eutogogic technologies in the 21st century education include:

1. Mobile Learning. Mobile reading and training. Mobile devices connected to the Internet and with computing capabilities The popularity of mobile "smart phones" in education.

2. Cloud computing. Over the past few years, the concept of cloud computing and the principle of virtualization have evolved significantly and become one of the most important technologies in the field of information and communication technologies. Many organizations have embarked on the implementation of this new technology in order to reduce infrastructure costs, management time, and costs for improved virtual machines. Cloud computing provides a convenient environment for users to use Internet applications: in this regard, the relevance of their use is of particular importance in the socio-political activities of the country, including the introduction and formation of e-government.

3. One-to-One computing. The information environment organized at the training site is increasingly close and friendly to the listener. At the same time, the principle of universal access to technology is promoted, which provides convenient use of different devices in different situations (creation of a transparent classroom based on laptops, computers, smart phones, tablets, etc.).

4. Ubiquitous learning. The principle of "anytime, anywhere" implies the improvement of the duration and organization of the traditional lesson: it creates "ubiquitous" opportunities for the listener through a virtual environment.

5. Personalized learning. Person-centered learning allows the listener to acquire the required amount and content of knowledge and to apply different teaching methods in the desired way.

6. Redefinition of learning spaces. The principle of rediscovering the learning space implies that students work collaboratively, find interdisciplinary balance, and create an environment that is student-centered and adaptable.

It can be said that the implementation of independent education involves the use of information and communication technologies, the Internet and its capabilities in all of the above types of education. Taking advantage of these educational opportunities, alternative use will ensure continuous professional development of teachers. Independent education should be considered as an integral part of continuing pedagogical education, the process of independent education as a personal and professional value of the teacher, and in this regard, in contrast to the independent educational activities of students, the system of professional training of teachers.

The following direct forms of professional development of teachers are used:

training in a specialized educational institution for advanced training;

Teaching by the "teacher-student" method;

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 11-15
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

independent reading;

distance learning;

gain experience in the form of internships.

The need for independent pedagogical education, on the one hand, the characteristics of pedagogical activity, its social role, on the other hand, the constantly changing conditions of pedagogical work, the needs of society, the evolution of science and practice, increasing demand for teachers, its rapid adaptation to changes in society ability to restructure their activities, to create new, more complex professional issues, to create continuous educational trends associated with their willingness to solve problems effectively.

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VOLUME 05 ISSUE 12 Pages: 16-18
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajas

Research Article

ASSESSMENT OF COMPLIANCE WITH INFORMATION SECURITY REQUIREMENTS VIA SECUBE

Submission Date: December 10, 2023, **Accepted Date:** December 15, 2023,
Published Date: December 20, 2023 |
Crossref doi: https://doi.org/10.37547/tajas/Volume05Issue12-04

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ABSTRACT

This article focuses on the assessment of compliance with information security requirements using SeCube, a comprehensive information security management system. It explores how SeCube facilitates organizations in meeting various information security standards and regulations. Key features of SeCube, such as risk assessment, policy management, incident tracking, and compliance reporting are examined. The article also highlights the benefits and challenges of using SeCube for compliance purposes, providing insights into its effectiveness in maintaining high information security standards.

KEYWORDS

SeCube, Information Security, Compliance, Risk Assessment, Policy Management, Incident Tracking, Compliance Reporting.

INTRODUCTION

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 16-18
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

In the current digital landscape, compliance with information security requirements is paramount for organizations. SeCube emerges as a pivotal tool in this context, offering a suite of functionalities to ensure adherence to information security standards and regulations. This article delves into SeCube's capabilities in risk assessment, policy management, and compliance reporting, highlighting its role in simplifying and enhancing the compliance process. Understanding SeCube's application in maintaining information security compliance is crucial for organizations aiming to safeguard their data and systems.

Main Study Sections

Risk Assessment and Management with SeCube

SeCube's risk assessment module enables organizations to identify, evaluate, and prioritize information security risks. The system provides tools for continuous monitoring of risks, facilitating proactive risk management. Integration with external data sources enhances the risk assessment process, allowing for a more comprehensive understanding of potential security threats.

Policy Management and Compliance Tracking

SeCube aids in developing and managing security policies that are aligned with various information security standards. The platform enables tracking of policy adherence, ensuring that all organizational activities comply with set security policies. SeCube's policy management capabilities support the alignment of business processes with regulatory requirements, thus enhancing compliance.

Incident Tracking and Reporting

The incident tracking feature of SeCube allows for efficient recording and analysis of security incidents, which is vital for compliance. SeCube's reporting tools enable the generation of detailed compliance reports, simplifying the process of demonstrating compliance to regulatory bodies. Automated alerts and notifications in SeCube keep relevant stakeholders informed about compliance-related issues and incidents.

Benefits and Challenges in Using SeCube for Compliance

SeCube offers a centralized platform for managing various aspects of information security, streamlining the compliance process. The system's scalability and adaptability make it suitable for organizations of different sizes and sectors. Challenges may include the need for specialized training to utilize SeCube effectively and the ongoing requirement to update the system in line with evolving security standards.

CONCLUSION

SeCube serves as an effective tool for assessing and maintaining compliance with information security requirements. Its comprehensive features in risk management, policy management, incident tracking, and compliance reporting enable organizations to address the complexities of information security compliance efficiently. The benefits of using SeCube for compliance purposes are significant, including streamlined processes, improved risk management, and enhanced policy adherence. However, the effective utilization of SeCube requires an understanding of its capabilities, continuous updates, and proper training for relevant personnel.

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(ISSN – 2689-0992)
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(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 19-21
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajas

Research Article

INCORPORATING SPORTS PSYCHOLOGY TECHNIQUES INTO CHILDREN'S PLAYGROUND ACTIVITIES FOR PSYCHOLOGICAL DEVELOPMENT

Submission Date: December 10, 2023, **Accepted Date:** December 15, 2023,
Published Date: December 20, 2023 |
Crossref doi: https://doi.org/10.37547/tajas/Volume05Issue12-05

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ABSTRACT

This article examines the incorporation of sports psychology techniques into children’s playground activities and its impact on the psychological development of children. It explores how principles and practices from sports psychology can be adapted to playground settings to enhance cognitive and emotional growth, improve social skills, and foster resilience in children. The article underscores the importance of integrating psychological well-being into physical play, highlighting innovative strategies that facilitate this integration and the positive outcomes observed from such approaches.

KEYWORDS

Sports psychology, Children's playgrounds, Psychological development, Cognitive growth, Emotional resilience, Social skills, Play therapy.

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 19-21
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

INTRODUCTION

Integrating sports psychology techniques into children's playground activities presents an innovative approach to fostering psychological development in young minds. The playground, traditionally a space for physical activity, can also serve as a dynamic environment for cognitive and emotional growth. This article explores the application of sports psychology in playground settings, examining how these techniques can be used to enhance not only the physical but also the psychological well-being of children.

Main Study Sections

Theoretical Foundations of Sports Psychology in Play This section discusses the key concepts of sports psychology relevant to children's development, such as goal-setting, positive reinforcement, and mental imagery. It examines how these concepts can be translated into playful activities on the playground, contributing to the cognitive and emotional development of children.

Developing Emotional Resilience through Play Focuses on how playground activities, influenced by sports psychology, can aid in developing emotional resilience in children. Techniques such as stress management, coping strategies, and building self-esteem are explored, demonstrating their applicability in play scenarios to help children navigate challenges and setbacks.

Enhancing Social Skills and Teamwork This part delves into the role of sports psychology in enhancing social skills and teamwork among children. Group activities and games are analyzed to show how they can be structured to encourage cooperation, communication, and empathy, essential components of social development.

Case Studies and Practical Implementations Presents real-world examples and case studies where sports psychology techniques have been successfully integrated into playground activities. This includes observations from educators, psychologists, and children, providing a comprehensive view of the practical benefits and challenges encountered.

Evaluating the Impact and Future Directions Discusses methods for evaluating the effectiveness of incorporating sports psychology into playground activities. It also considers future directions for research and practice in this area, including potential advancements in integrating technology and interactive play equipment.

CONCLUSION

Incorporating sports psychology techniques into children's playground activities offers a unique and effective approach to enhancing psychological development. By blending physical play with cognitive and emotional learning, children can develop resilience, social skills, and a positive mindset. The continued exploration and implementation of these strategies hold great promise for enriching the developmental experiences of children in playground settings.

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The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 22-29
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

Journal Website: https://theamericanjournals.com/index.php/tajas

Research Article

MORPHOBIOLOGICAL CHARACTERISTICS OF THE ENTOMOPATHOGENIC NEMATODE "HETERORHABDITIS BACTERIOPHORA" (POINAR, 1976) IDENTIFIED IN UZBEKISTAN

Submission Date: December 14, 2023, **Accepted Date:** December 19, 2023,
Published Date: December 24, 2023 |
Crossref doi: https://doi.org/10.37547/tajas/Volume05Issue12-06

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ABSTRACT

The research article discusses the identification of a new local entomopathogenic nematode, "Heterorhabditis bacteriophora," in Uzbekistan. The article includes an analysis of its morphological and molecular characteristics. Additionally, the reproductive and developmental traits of this species, recognized globally as a prolific biocontrol agent, are elaborately presented, along with methods for its extraction from the soil. The future prospects of this entomopathogenic nematode's biocontrol potential and areas for further study are highlighted, making this research a valuable resource for scientists and biolaboratory specialists.

KEYWORDS

Uzbekistan, entomopathogenic nematodes, Heterorhabditis spp, in vivo, potato, biocontrol.

INTRODUCTION

The initial types of entomopathogenic nematodes in Uzbekistan were identified in the agrobiocenosis of potato crops. Notably, representatives of the Heterorhabditidae family (Poinar, 1976) are distinguished by their infectious third-stage larvae, which can develop into either hermaphroditic or amphimictic females upon reaching sexual maturity. The research was conducted during 2020-2023, with soil samples collected from potato agrobiocenoses in the Qibray district of Tashkent region. These samples were thoroughly analyzed at the "Laboratory of Biological Protection Against Pests and Diseases" of the Research scientific institute of plant protection and quarantine in Uzbekistan.

MATERIALS AND METHODS

In vivo multiplication of entomopathogenic nematodes involves removing all residues from soil samples collected from the field. If necessary, the soil

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 22-29
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

is moistened to improve its humidity. The prepared soil sample is then placed in lidded plastic containers, and ten late-stage larvae of G. mellonella are placed on each soil sample. The containers are incubated upside down at 55% relative humidity (RH) and a temperature of 25°C in a dark place. Infected larvae showing specific signs of entomopathogenic nematode infection are removed from the soil after 7 – 10 days and placed in a "White Trap" to collect third-stage infectious nematodes.

If the larvae are infected with Heterorhabditis nematodes, they turn reddish-brown to black. The suspension containing entomopathogenic nematodes is stored in a special flask at a temperature of 10-15°C in an incubator.

For the identification of entomopathogenic nematode species, the following diagnostic key can be used:

Representatives of the Heterorhabditidae family have both hermaphroditic and amphimictic females.

Hermaphroditic female:

Nematodes at the infectious larval stage turn into hermaphroditic nematodes after entering the insect body.

The head is slightly rounded with six separate conical lips, each provided with a terminal papilla; small raised structures are sometimes visible under each lip; the amphidial opening is small.

The stoma is wide but short; Cheilorhabdions are present, forming a ring, appearing as two refractive points in lateral view.

The other parts of the stoma merge to form an expanded posterior area, directly connected to the esophagus.

The nerve ring is located in the middle of the isthmus.

The excretory opening is usually located on the posterior side of the esophagus.

The vulva is median, slit-like, bordered by elliptical rings; the ovotestis is amphidelphic, reflexed.

Ovaries are present.

The tail is pointed and long.

Amphimictic female:

Smaller than the hermaphroditic female; has labial papillae.

The sexual system is amphidelphic, the vulva is not adapted for egg-laying but rather for mating.

Male:

A single, reflexed testis.

Paired spicules, separate and slightly bent towards the abdominal cavity. The head of the spicule is short and narrowed, distinct from the rest.

The gubernaculum is usually half the length of the spicule.

Formed with a bursa peloderan with nine pairs of genital papillae.

Infectious stage nematode larvae:

Third-stage infectious larvae (IL) are usually sheathed (due to the skin of second-stage larvae). The anterior area forms a mosaic pattern and longitudinal lines with the sheath.

The IL cuticle has two ridges bordering a uniform line in lateral areas.

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 22-29
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
Publisher: The USA Journals

The head area has dorsal teeth. Mouth and anal openings are closed.

The stoma resembles a closed chamber with parallel walls.

The esophagus and intestine are poorly developed.

The excretory opening is located behind the nerve ring.

The tail is blunt.

Identification of Heterorhabditis species: After identifying Heterorhabditis species with the help of the key, confirm the species by comparing its morphometry with the original descriptions.

The following ratios and abbreviations are used in the key: IL = Infectious larvae. EP = Distance from the anterior end to the excretory pore. T = Tail length. E% = EP/T × 100. GS% = Gubernaculum length divided by spicule length × 100. m = micrometer.

Table 1.

Key to the Species of the Heterorhabditis Genus

#	Criteria	Species
1	Average body length of IL > 700 µm (736–800)	H. megidis
	Average body length of IL < 700 µm (528–685)	Go to 2
2	IL tail short, avg. 76 µm (68–80), E% ~147	H. brevicaudis
	IL tail longer, avg. > 80 µm (84–119), E% = 127 or less	Go to 3
3	IL body length avg. > 600 µm	Go to 4
	IL body length avg. < 600 µm	Go to 6
4	IL with E% > 120, c > 7; spicular lamina with ventral expansion	H. argentinensis

The American Journal of Applied sciences
(ISSN – 2689-0992)
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OCLC – 1121105553
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#	Criteria	Species
	IL with E% < 120, c < 7; spicular lamina without ventral expansion	Go to 5
5	IL body length avg. 654 µm, E% ~96, c ~6.1; Male body width avg. 51 µm, spicule length avg. 45 µm	H. marelatus
	IL body length avg. 685 µm, E% ~108, c ~6.6; Male body width avg. 41 µm, spicule length avg. 51 µm	H. zealandica
6	IL body length avg. 528 µm, E% ~94	H. indicus
	IL body length avg. 570 µm, E% > 100	Go to 7
7	IL's E% ~127; spicule avg. 47 µm, lamina with ventral expansion	H. hawaiiensis
	IL's E% ~112, spicule avg. 40 µm, lamina without ventral expansion	H. bacteriophora

Note: IL = Infectious Larvae, E% = Ratio of Esophagus Length to Tail Length, µm = Micrometers

(a) Morphometrics of IJS (Infectious juvenile stage) alone are insufficient for species identification. Characteristics of both male and female nematodes must also be considered.

(b) IJS produced in artificial environments (cultivated in laboratories or commercial products) tend to have a shorter lifespan compared to those produced in vivo and may not fully meet the criteria of the original species description.

(c) Male and female nematodes are collected 4 or 5 days after the demise of the infested insect host.

(d) For accurate species identification, measurements of at least 10 specimens should be taken.

The American Journal of Applied sciences
(ISSN – 2689-0992)
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SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
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(e) For verification of identification, the morphological and morphometric characteristics of the identified nematode at various stages should be compared and checked against the original described features.

The phylogenetic relationships of entomopathogenic nematode species within the Heterorhabditidae family were studied using the mitochondrial DNA COX region analysis. For constructing the phylogenetic tree of the Heterorhabditis genus species (Heterorhabditis bacteriophora, Heterorhabditis indica, Heterorhabditis megidis), samples collected from the Surxondaryo region and ITS sequences of 16 species from this genus available in the National Center for Biotechnology Information (NCBI, GenBank) were used. The sequences were aligned using the Multiple Sequence Alignment by MAFFT tool (https://www.genome.jp/tools-bin/mafft). The data obtained from the comparison were edited and a phylogenetic tree was constructed based on maximum likelihood using the IQ-TREE web server (https://iqtree.cibiv.univie.ac.at/). The command code used was: path_to_iqtree -s Heterorhabditis.ph -st DNA -m TEST -bb 1000 -alrt 1000. The phylogenetic tree was visualized using the iTOL web tool (https://itol.embl.de/login.cgi). Heterorhabditis sp. was taken as the outgroup.

The results showed that the Heterorhabditis bacteriophora we studied, registered in the NCBI database under accession number OP578207.1 (Authors: Hassan,M., Hamad,A. and Albogame,B.), was placed in a monophyletic group sharing a common ancestor (see Image I clad), with a bootstrap support value of 97.4/100. Heterorhabditis indica, registered under accession number MK271288.1 (Authors: Rana,A. and Chaubey,A.K.), was also placed in a monophyletic group sharing a common ancestor (see Image VI clad), with a bootstrap value of 100/100. Heterorhabditis megidis, registered under accession number MZ675644.1 (Authors: Ozawa,S., Maehara,N., Takatsuka,J., Aikawa,T. and Nakamura,K.), was placed in a monophyletic group with a common ancestor (see Image VIII clad), with a bootstrap value of 100/100.

The American Journal of Applied sciences
(ISSN – 2689-0992)
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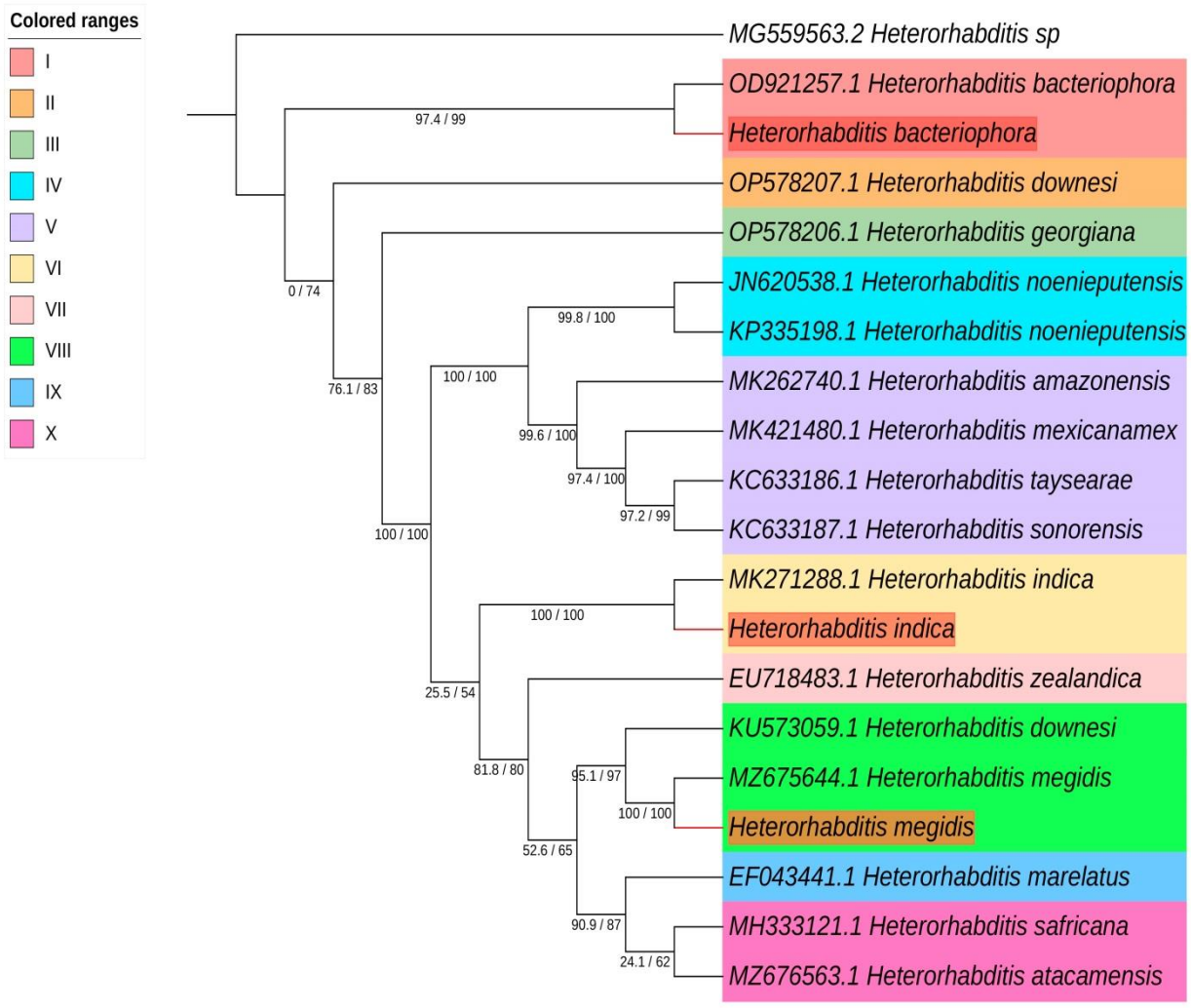
OCLC – 1121105553
Publisher: The USA Journals



1 – Image. Phylogenetic tree of entomopathogenic nematode species belonging to the steinernematidae family

CONCLUSION

The discovery of a new local entomopathogenic nematode, Heterorhabditis bacteriophora (Poinar, 1976), in Uzbekistan, and the study of its morphobiological characteristics highlight the importance of considering morphometric traits, including those of female and male nematodes, as well as the morphology of infectious larvae, for species identification.

Comparative analysis of mitochondrial DNA COX region-based phylogenetic analysis, ITS sequences from NCBI (GenBank), and morphometric data of the studied samples revealed a match with existing data for Heterorhabditis bacteriophora in the NCBI database.

In conclusion, the samples studied in our research and the ITS sequences obtained from NCBI database formed a single monophyletic group with the representatives of the same species studied by other

The American Journal of Applied sciences
(ISSN – 2689-0992)
VOLUME 05 ISSUE 12 Pages: 22-29
SJIF IMPACT FACTOR (2020: 5. 276) (2021: 5. 634) (2022: 6. 176) (2023: 7. 361)
OCLC – 1121105553
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researchers. This confirms the accuracy of our research at the molecular level.

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