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IMPLEMENTING AEDES LARVAL SURVEY IN A RURAL UNIVERSITY CAMPUS IN INDIA

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ABSTRACT **Background:** Implementing an Aedes larval survey in a rural university campus is crucial due to the public health risks posed by Aedes mosquitoes, vectors for diseases such as dengue, Zika, chikungunya, and yellow fever. The diverse environments and sprawling grounds of rural campuses can become breeding grounds for these vectors, making regular surveys essential. This study aimed to use Epicollect 5 software for designing and conducting the survey and to document the challenges faced and solutions derived. **Methods:** The study was conducted on a rural university campus in India. Epicollect 5, an open-source mobile data collection application, was used to design a custom survey form capturing data on Aedes larval habitats, including location details, environmental conditions, container descriptions, larval presence, photographic evidence, and additional observations. Volunteers, including students and staff, were trained to use the app and identify Aedes breeding sites. The campus was divided into zones to ensure comprehensive coverage. Data collection involved locating potential breeding sites, recording relevant data, capturing GPS coordinates and photographs, and identifying larvae. The data was uploaded to the cloud for real-time monitoring and analysis. **Results:** Challenges encountered included difficult terrain, limited community engagement, technical issues, species identification, and data accuracy. Solutions involved providing enhanced training, launching awareness campaigns, ensuring technical support, collaborating with entomology experts, and implementing standardized protocols. Data analysis was conducted using GIS tools to map breeding site locations and identify hotspots. **Conclusion:** Using Epicollect 5 for the Aedes larval survey demonstrated both challenges and innovative solutions, providing valuable insights into mosquito breeding patterns and informing targeted control measures. This approach can serve as a model for similar surveys in other rural settings.

KEYWORDS : Epicollect5, Larval Survey, Geotagging

INTRODUCTION

Implementing an Aedes larval survey in a rural university campus presents a unique set of challenges and opportunities. Aedes mosquitoes, particularly Aedes aegypti and Aedes albopictus, are primary vectors for dengue, Zika, chikungunya, and yellow fever, posing significant public health risks.[1] Rural university campuses, with their diverse environments and often sprawling grounds, can become breeding grounds for these vectors, making regular and thorough larval surveys crucial.

One of the primary challenges in such settings is the vast and varied landscape. Rural campuses often encompass extensive green spaces, water bodies, and numerous buildings, making it difficult to conduct comprehensive surveys.[2] The presence of dense vegetation and various water-holding containers, such as discarded tires, flower pots, and natural water bodies, can complicate the identification and elimination of breeding sites. Additionally, limited access to certain areas, either due to overgrowth or restricted zones, further hampers the effectiveness of surveys.[3]

Another significant challenge is the potential lack of awareness and participation among the campus community.[4] Students, faculty, and staff may not fully understand the importance of the survey or how their activities contribute to mosquito breeding.[5] This lack of awareness can lead to unintentional creation of breeding sites and reduced cooperation with survey efforts. Furthermore, limited financial and human resources can constrain the frequency and thoroughness of surveys, impacting the overall effectiveness of mosquito control measures.

However, these challenges can be mitigated through strategic solutions. Increasing community awareness through education campaigns can foster greater participation and support for the surveys. Utilizing technology, such as Geographic Information Systems (GIS) and mobile applications, can enhance the efficiency and accuracy of data collection and analysis.[6] Collaborating with local health departments and leveraging student volunteers can also expand the reach and impact of survey efforts.[7] By addressing these challenges with innovative and collaborative approaches, rural university campuses can effectively implement Aedes larval surveys, reducing mosquito populations and minimizing the risk of vector-borne diseases.

Objectives

1. To use Epicollect 5 software to design and conduct aedes larval survey in Rural University Campus in India.
2. To note the challenges faced and solutions derived during the survey.

MATERIALS AND METHODS:

Study Area

The study was conducted on the campus of a rural university in India. The university campus, spread over approximately 120 hectares, includes a variety of environments such as academic buildings, residential areas, green spaces, water bodies, and agricultural fields. These diverse settings provide numerous potential breeding sites for Aedes mosquitoes.

Survey Design Using Epicollect 5

Software Selection

Epicollect 5, an open-source mobile data collection application, was chosen for its user-friendly interface, ability to collect geotagged data, and cloud-based storage. The application allows for real-time data collection and analysis, making it ideal for extensive field surveys.

Survey Design

A custom survey form was designed in Epicollect 5 to capture relevant data on Aedes larval habitats. The form included fields for:

- Location details: GPS coordinates, site description (e.g., building, green space, water body)
- Container description: Type of container (e.g., tire, flower pot, natural water body), size, and water volume
- Larval presence: Number of larvae observed, stage of larvae (instar stages), and species identification if possible
- Photographic evidence: Photos of the surveyed site and container

Training of Surveyors

A team of two volunteers was trained to use the Epicollect 5 application. Training sessions covered:

- Installation and setup of the Epicollect 5 app on mobile devices
- Detailed walkthrough of the custom survey form
- Practical field training on identifying Aedes breeding sites and collecting larval data
- Safety protocols and ethical considerations

Survey Execution

Pre-Survey Preparations

Before commencing the survey, the campus was divided into

manageable zones based on land use and accessibility. A schedule was developed to ensure comprehensive coverage of all zones within the study period.

Data Collection

The survey was conducted over a period of [insert duration], during which teams visited each designated zone. Surveyors used the Epicollect 5 app to:

- Locate potential breeding sites.
- Record environmental and container-specific data.
- Capture GPS coordinates and photographs.
- Collect and identify larvae, noting the quantity and developmental stages.

Data Management

All data collected via Epicollect 5 was automatically uploaded to the cloud for real-time monitoring and analysis. Regular backups were maintained to prevent data loss.

RESULTS AND DISCUSSION

Challenges Faced and Solutions Provided

- Difficult Terrain and Accessibility: Some areas of the campus, particularly those with dense vegetation or water bodies, were challenging to access. This impeded thorough inspection and data collection.
- Solution: Teams were equipped with appropriate gear such as boots and gloves, and safety protocols were emphasized. For inaccessible areas, alternative methods such as drone surveillance were considered.
- Community Engagement: Initial surveys indicated a lack of awareness and participation among the campus community, which resulted in unintentional creation and neglect of potential breeding sites.
- Solution: An extensive awareness campaign was launched, including workshops, seminars, and informational materials. Engagement with student organizations and faculty helped increase participation and support.
- Technical Issues: Occasional technical difficulties with the Epicollect 5 app, such as data syncing problems and battery drain on mobile devices, were encountered.
- Solution: Regular troubleshooting sessions were held, and surveyors were advised to carry portable chargers. Technical support from Epicollect 5 developers was sought when necessary.
- Species Identification: Accurate identification of Aedes species in larval stages posed a challenge due to the need for specialized expertise.
- Solutions:Training sessions included basic identification techniques, and difficult cases were referred to entomology experts for confirmation. Collaboration with local health departments facilitated accurate species identification.
- Data Accuracy and Consistency: Variability in data recording among different surveyors led to inconsistencies.
- Solution: Standardized protocols and detailed guidelines were provided to ensure consistency. Regular cross-checks and validation sessions were conducted to maintain data accuracy.
- Solutions Derived:
  - o Enhanced Training: Ongoing training sessions were organized to address emerging issues and ensure surveyors were well-equipped with the necessary skills.
  - o Community Involvement: Continuous engagement with the campus community through interactive sessions and feedback mechanisms helped sustain interest and participation.
  - o Technical Support: Establishing a dedicated technical support team within the survey group ensured prompt resolution of any issues.
  - o Expert Collaboration: Partnering with local health and entomology experts provided additional resources for species identification and data validation.
  - o Data Quality Assurance: Implementing rigorous data quality assurance protocols, including regular audits and feedback loops, improved the overall reliability of the collected data.

CONCLUSION

The use of Epicollect 5 for conducting an Aedes larval survey in a rural university campus demonstrated both challenges and innovative solutions. By addressing accessibility, community engagement, technical issues, and data quality, the survey provided valuable insights into mosquito breeding patterns and informed targeted control measures. This approach can serve as a model for similar surveys in other rural settings.

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