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DIGITAL RODENT MONITORING RECOMMENDED SYSTEM FEATURES

V1.0

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DIGITAL RODENT MONITORING RECOMMENDED SYSTEM FEATURES AND BEST PRACTICES

INTRO

This document is a guide for Quality Assurance Managers, Facility Managers and anyone else who is actively involved in their organization's pest management protocol, who is interested in or beginning the process of adopting a digital rodent monitoring system. In it you will find suggestions for key features to consider when identifying a system that is right for you.

PREAMBLE

In the past, an industry standard for interior rodent monitoring in facilities consisted of deploying multi-catch traps in key areas within a facility to detect rodent presence. A pest management professional (PMP) was needed to routinely inspect each trap within the facility, remove captured rodents and note rodent activity. This lengthy, laborious process leaves limited time to make thorough and proper inspections of conditions throughout the facility and take corrective actions and preventive measures.

To ensure quality of service and that each trap was checked, barcodes were added to the interior surface of the trap. This had the unintended consequence of transforming pest control into the tedious act of trap-checking, where the service prioritized barcode scanning over quality inspections and correcting conditions conducive to rodent activity. To restore the balance between efficiency and quality, a new approach to integrate automation in rodent monitoring is needed.

The "Internet of Things" ("IoT"), is driving a technological revolution that is rapidly changing the way we interact with numerous devices in our environment. Applications are being made in smart homes with connected appliances, smart industrial systems and smart agriculture with connected tractors, satellite imagery and in-field sensors. Letting computers collect data from connected things, such as rodent traps and gathering other related information can empower us to observe, identify and understand situations in real-time with minimal human intervention.

The incorporation of IoT systems into pest control will inevitably alter pest management service(s). This digital rodent monitoring protocol presents best practices for digital monitoring as applied to rodent monitoring programs.

RODENT MONITORING SYSTEMS SHOULD HAVE THESE FEATURES:

1. DIGITAL MAP (TO PROVIDE SPATIAL UNDERSTANDING)
2. TIME STAMPS ON CAPTURES (TO PROVIDE TEMPORAL UNDERSTANDING)
3. DAILY MONITOR / SYSTEM STATUS REPORTING (FOR AUDIT COMPLIANCE)
4. AUTOMATIC SYSTEM MAINTENANCE AND COMPLIANCE REPORTING
5. MOVEMENT TRACKING TO ASSESS THE LOCATION BEING MONITORED
6. RELIABLE WIRELESS SIGNAL PROPOGATION THROUGH COMPLEX ENVIRONMENTS
7. ABILITY TO DETECT FALSE POSITIVE OR FALSE ALERTS
8. WATER AND DUST RESISTANCE

At its core, digital rodent monitoring offers the PMP technician two views into the facility that they had not previously had access to: spatial and temporal understanding of the pest's environment.

1. DIGITAL MAP / SPATIAL UNDERSTANDING

In any facility rodents exist within their own complex ecosystem within the walls of the building. This rodent ecosystem includes foundational cracks, crevices through walls, pallets of food stuffs and nesting materials and structural voids in shelving units and walls. Human-beings seldom have full access to this world. Understanding how rodent capture events relate to this complex habitat helps tremendously in effectively mitigating rodent infestations. Without digital monitoring, trap locations exist on paper in a simple list with simple descriptions such as, "aisle 5 under bread", or "left side of dock door 4". While these simple descriptions serve to aid the PMP in locating the multi-catch trap, these fail to convey the spatial relationships among traps.

Digital rodent monitoring addresses this issue by illustrating on a digital map how traps relate to one another. This digital map should accurately reflect the current conditions of the facility and should be updated in the event that the facility has changed significantly. The addition of add-on structures, wings, or construction should be noted in the facility map so that the PMP has an updated perspective on where traps reside as well as the continually evolving landscape that the rodent may be hiding in.

Rodent captures in a given location can now reveal a spatial pattern of pest captures and thereby focus the investigative effort at trouble spots to pinpoint the source of pest activity. Digital rodent monitoring enables the PMP to view captures in real-time on a digital map that illustrates how rodent monitors and captures relate to one another. Devices that consistently capture rodents should signal to the PMP that additional investigative work is needed around the area to locate the origin of infestation.

2. TIME STAMPS ON CAPTURES / TEMPORAL UNDERSTANDING

Understanding how rodent captures relate to one another in time also greatly reduces the investigative work needed to understand rodent infestations. Digital rodent monitoring enables PMPs to receive up-to-the-minute updates on when rodents were captured, allowing PMPs to understand how captures are temporally related to one another. For instance, consistent rodent captures around noon at an exterior facing door that leads to the cafeteria might signal to the PMP that employees are propping open the door with the multi-catch trap during their lunch or smoke break. This information would have been previously unavailable to the PMP had they continued their regular service of manually checking each trap at weekly or monthly intervals.

3. DAILY MONITOR / SYSTEM STATUS REPORTING

While capture alerts are vital and enable swift action, the lack of capture notifications could also suggest a technical issue. Therefore, rodent monitoring systems should provide time-stamped monitor status at regular intervals such as every 24 hours. In the event that the system or device network reports irregular check-in patterns, we recommend that either the PMP or end-user investigates the cause of the irregular system messages.

4. SYSTEM MAINTENANCE AND COMPLIANCE REPORTING

Digital monitoring systems offer a reliable means of checking for rodent activity. However, to maintain its reliability, the system should be maintained with periodic inspection and calibration. An ideal rodent monitoring system should capture these maintenance events digitally so that system reliability and performance can be assured. A reliable system should enable ad hoc reporting of maintenance activity for audit compliance.

5. MOVEMENT TRACKING

Multi-catch traps are most effective when they are placed flush against the wall. When entering a building, mice will often travel along the wall as they navigate so traps placed along the wall have the highest likelihood of successfully capturing the rodent. In the event that, through normal activities of the facility (such as cleaning, staff interaction, product and equipment movement), a multi-catch trap is displaced, a move message is needed to inform the PMP and facility manager that the trap needs to be returned to its initial position. Rodent monitoring systems that utilize movement tracking enable a refined and more effective rodent control program.

6. WIRELESS SIGNAL PROPOGATION THROUGH COMPLEX ENVIRONMENTS

Facilities are typically a complex environment for wireless signals. Presence of heavy machinery, steel walls, metal shelving units and an assortment of various pipes throughout can make wireless signal transmission difficult. In order to be effective, all rodent monitoring systems must be able to communicate through these environments. Rodent monitoring systems should utilize a communication protocol / platform that allows long range signal transmission through metal machinery and equipment.

7. FALSE POSITIVE DETECTION

Much of the efficiencies gained by a rodent monitoring system are due to the fact that the Pest Management Professional (PMP) no longer needs to service multi-catch traps as frequently, because a “digital PMP” is monitoring the capture status of the monitor 24/7. However, these efficiencies can be lost if false positives occur too frequently; e.g. a janitor at the facility accidentally contacts the rodent monitor causing a capture message to transmit, even though no rodent was captured. Rodent monitoring systems using “edge-computing” to discriminate between false alerts and true captures are essential as false positives can undermine the efficiencies gained and operator confidence in the technology. False positive detection also enables PMP’s and facility managers to maintain data integrity of capture records. Furthermore, knowing which traps are jostled most frequently is valuable information as well, because the PMP can then relocate the multi-catch trap to a more suitable position or address the issue with facility staff.

8. WATER AND DUST RESISTANCE

In food processing/manufacturing environments, water and dust can be a common occurrence. Rodent monitoring systems that are both water and dust resistant are necessary in ensuring that these systems continue to be operational after exposure to water and dust. Rodent monitoring systems

should have an IP (Ingress Protection) rating of 54 or higher. The first digit (5) means limited protection against dust ingress (no harmful deposit) and the second digit (4) indicates the electrical component enclosure is protected against water splash from any direction. IP54 is appropriate for use in semi-wet production areas.

EPILOGUE

As is the case with any new technology, recommended system features will evolve over time as the technology becomes more widely used in various environments and situations. This document provides our point of view with regard to minimum system capabilities based on our experience. It is by no means the last word on this subject. However, it is offered as an information resource and a good place to start. Bayer will update these suggested features when appropriate. To receive your free copy of *Guidelines for the Digital Monitoring of Rodents*, contact Alec Senese at alec.senese@bayer.com.