Final Report
for
95 Applications L.L.C.
May 10, 2021

I. TITLE: Laboratory Evaluation of Averzion as a Physical Barrier.

II. OBJECTIVE: The purpose of this study is to determine if Averzion can be used as a physical barrier against common pest species from climbing surfaces coated with this material. These tests will be run using Arizona bark scorpions (*Centruroides sculpturatus*), American cockroaches (*Periplaneta americana*), Turkestan cockroaches (*Shelfordella lateralis*), and Oriental cockroaches (*Blatta orientalis*) (Fig. 1).

III. INVESTIGATORS: Phillip Shults, Research Associate and Dr. Ed Vargo, Professor and Endowed Chair, Rollins Urban and Structural Entomology Facility, Department of Entomology, Texas A&M University, College Station, TX 77843-2143, (979) 845-5855.

IV. PROCEDURE: A laboratory study was initiated by personnel from the Rollins Urban and Structural Entomology Facility at Texas A&M University in College Station, TX. Wild-collected scorpions and colony reared cockroaches were utilized in this study. The testing arena consisted of a 91 x 45 cm plastic container, with the interior walls coated with Fluon® to prevent arthropod escape. Two identical wooden structures (24 x 24 x 18 cm) were constructed to be placed into the arena (Fig. 1). The vertical surfaces of one of the structures received a single coat of paint and 30-40mils of Averzion while the other was left untreated to act as a control. After application of the

Averzion, the structure was allowed to air dry for 48 hours before the test was started. A thin layer of baby powder was dusted on top of each structure to monitor arthropod activity. Additionally, a food item (dead cockroach or dog food) was placed at the center of each structure to entice the arthropods to attempt to climb the walls (Fig. 2A). Four individuals of each species tested were placed into the arena and were monitored daily for three days (each species was run separately). These tests were run under normal laboratory conditions (24 °C ; 12:12 day/night cycle, 40% relative humidity) and pictures were used to document arthropod activity as well as removal of the food item.

Procedural amendment: The tops of both wooden structures were painted black for the cockroach trials to better observe the evidence of arthropod activity (Fig. 3A).

V: RESULTS AND DISCUSSION:

Scorpions

Upon placing the scorpions into the area, they immediately started to climb the untreated structure. Attempts were made to climb the structure treated with Averzion, however, they were unable to do so. After 24 hours, the food item was removed from the untreated structure while the food item on the treated structure remained in its original location (Fig. 2B). At the end of the trial, it was apparent that the scorpions had made it to the top of the untreated structure many times as the baby power had numerous track marks (Fig. 2C). The baby powder at the top of the structure treated with Averzion remained undisturbed and the food item was never removed. This, in combination with our direct observation, provides evidence that Averzion acted as a physical barrier against scorpions when tested under these laboratory conditions.

Cockroaches

As with the scorpions, all of the cockroach species were able to climb the control structures with ease. Attempts were made to climb the structure coated in Averzion (see attached video file), however, no successfully attempts were directly observed. After 72 hours, the baby powder on top of the Averzion coated structure remained undisturbed in both the Turkestan and Oriental trials with substantial activity observed on the control structure. A few track marks were found on top of the Averzion coated structure in the American cockroach trial, though much fewer than were found on the control structure (Fig. 3). In both the American and Oriental cockroach trials, the disturbance of the baby powder clearly shows the difference in accessibility to the control and Averzion coated structures (Figs. 3 & 4). In the Turkestan cockroach trial, the signs of activity were not as apparent though slight track marks and fecal material were clear signs that these roaches were able to access the top of the control structure (Fig. 5). The dog food was never removed by any cockroach species during any of the trials. While perhaps not a completely impervious physical barrier against all cockroaches species, Averzion appears to have effectively limited their ability to transverse the coated structure.

VI: SIGNATURES:

May 10, 2021

Dr. Ed Vargo
Professor and Endowed Chair

Date

May 10, 2021

Phillip Shults
Research Associate

Date

VII: FIGURES:

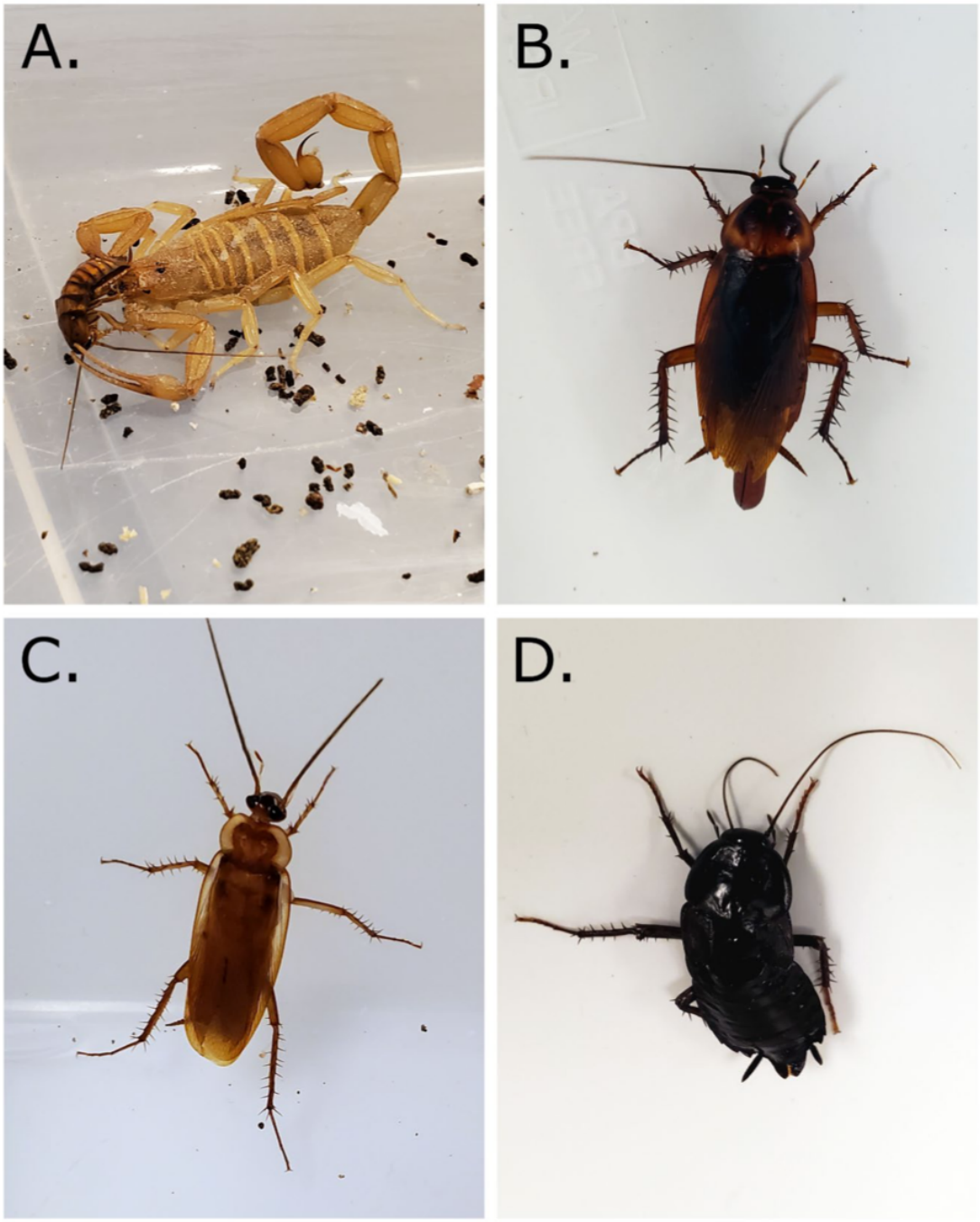

Figure 1. The species of Arthropods used in these experiments; (A) Arizona bark scorpion, (B) American cockroach, (C) Turkestan cockroach, and (D) Oriental cockroach.

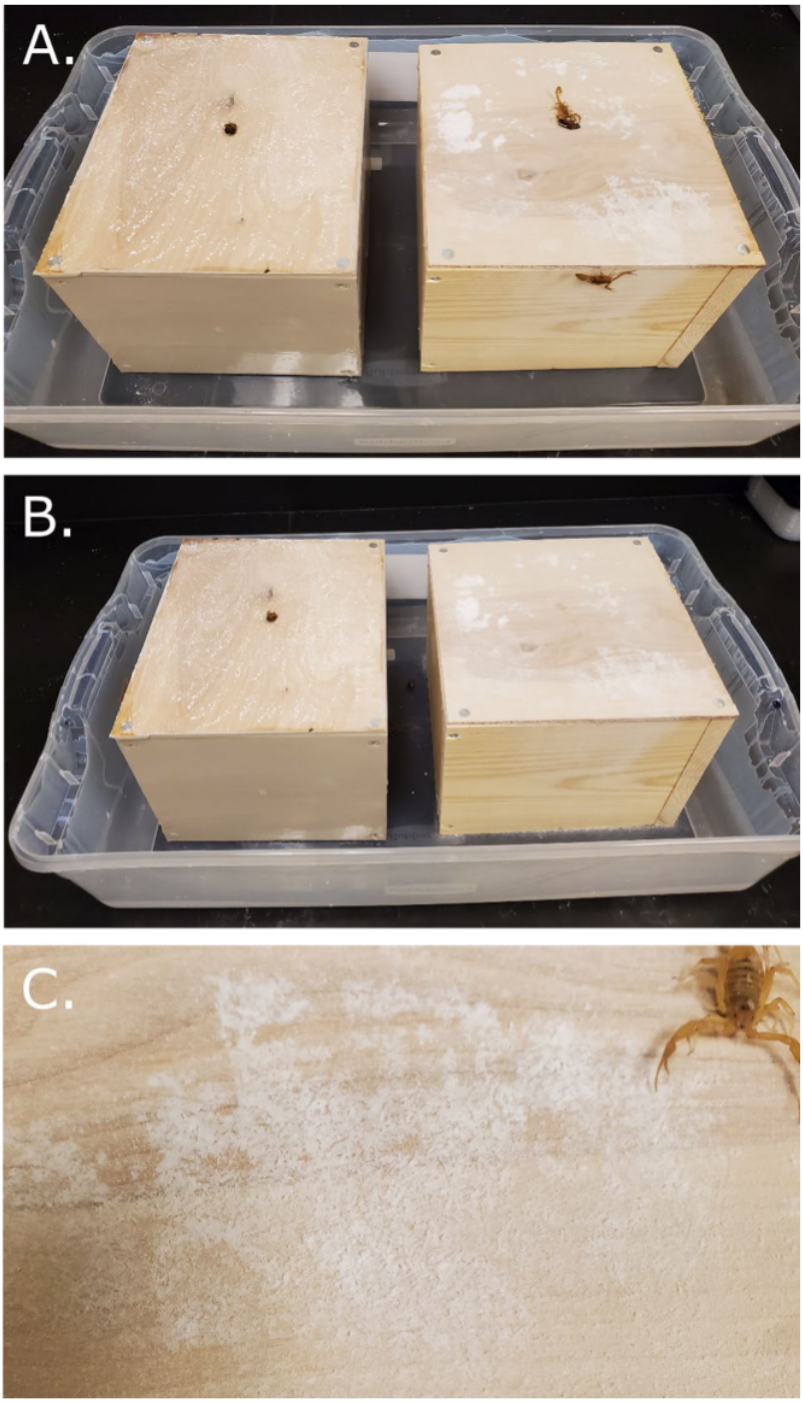

Figure 2. The testing arena and wooden structures used in scorpion trial at (A) 15 minutes and (B) 24 hours after the introduction of the scorpions. The structure coated in Averzion is on the left and the untreated control is on the right. The food item on the control structures was removed after 24 hours (see B). (C) The track marks left in the baby powder showing activity on top of the structure.

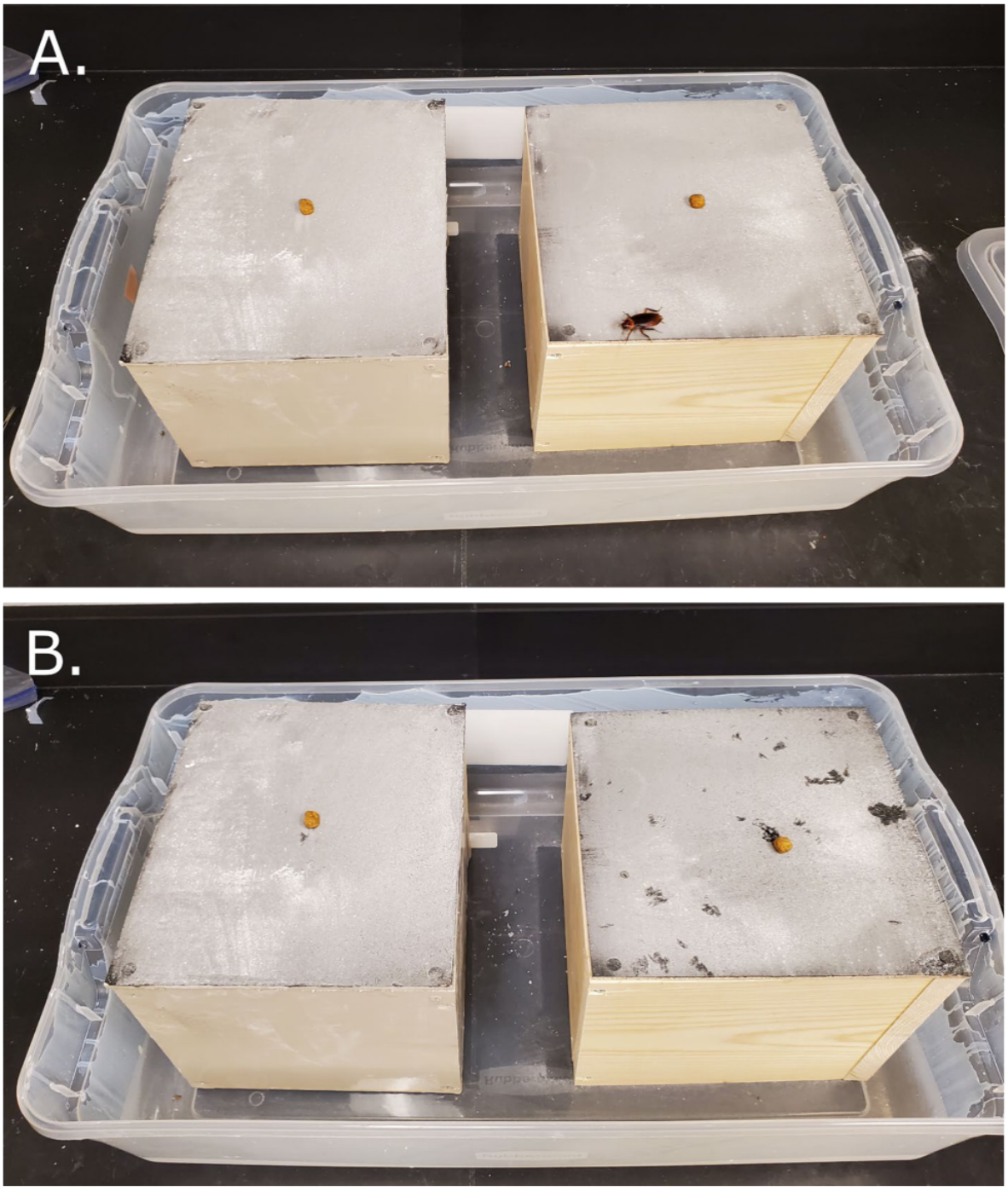

Figure 3. The testing arena and wooden structures used in cockroach trials at (A) 15 minutes and (B) 72 hours after the introduction of American cockroaches.

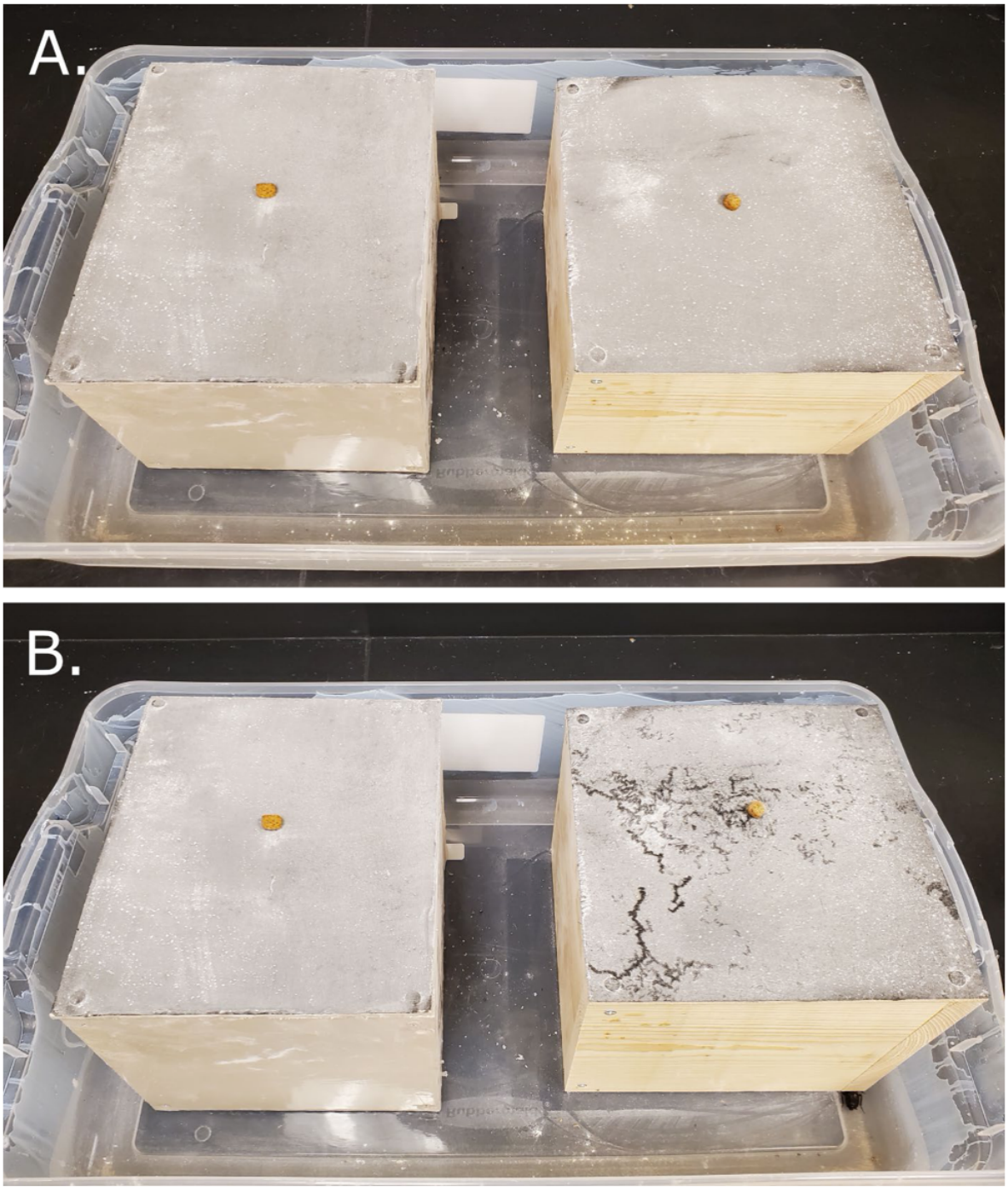

Figure 4. The testing arena and wooden structures used in cockroach trials at (A) 15 minutes and (B) 72 hours after the introduction of Oriental cockroaches.

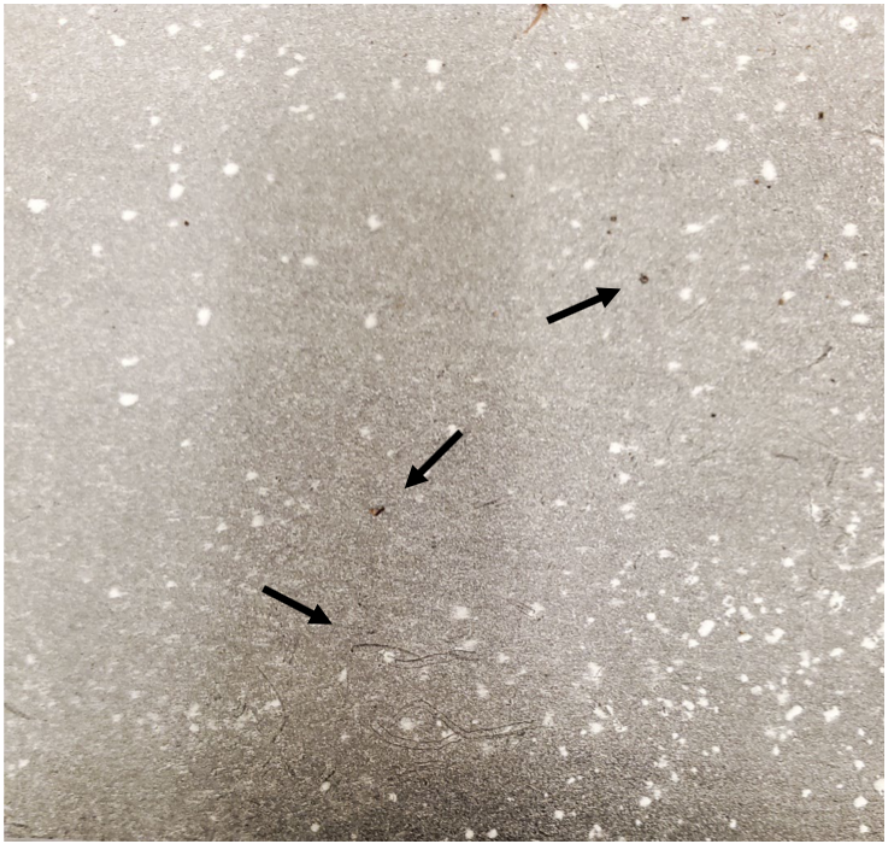

Figure 5. Pictured are slight track marks and fecal pellets left by Turkestan cockroaches on top of the control structure.