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Project Briefing: **Training of Conservation Detection Dogs to Locate Kincaid's Lupine Plants (*Lupinus sulphureus kincaidii*)**

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Introduction

In July 2007, the Working Dogs for Conservation Foundation (WDCF) in collaboration with the Oregon Wildlife Institute (OWI) and The Nature Conservancy began the first phase of research efforts to assess "proof of concept" and determine if dogs are capable of discriminating the scent of a native, rare, plant species from all other plant species in the field. Five dogs were selected and trained to detect Kincaid's lupine in a controlled setting, and at a natural field site, in the Willamette Valley of Oregon. Here a summary of training and results of this first phase of research are provided.

Summary of Training Activities

Five dogs were trained to detect Kincaid's lupine. All dogs had been trained prior with a combination of standard narcotic, cadaver, and search-and-rescue detection techniques for various purposes. Thus, at the start of training to detect Kincaid's lupine plants, all dogs possessed a complete understanding of detection work, and in particular how to recognize the scent of a target object, search for that target object in a controlled and natural setting, and indicate to its handler when it found the target source.

Dogs were first introduced to the scent of lupine through clippings of plants. Initial training involved using a scent box that contained clippings from Kincaid's lupine. Once the dog learned to associate the scent of these lupine materials with a reward, he was conditioned to indicate that he had found the target odor by giving an alert (e.g. sit, lie down, hover and stare) next to the box containing the clippings. An average of 45 repetitions was completed by each dog. During this initial training, the dogs appeared to quickly show recognition to this new scent of Kincaid's lupine and offer their handlers alerts to indicate its presence.

Before proceeding to the next scenario of training, overall odor recognition by dogs was assessed. Each dog was worked through 10 trials with two experimental designs. Two types of mistakes were possible

in trials, 1) 'missing a target' (i.e. dog fails to alert to a target object that is present), and 2) 'false response' (i.e. dog alerts to a non-target object that is present). Successful performance was defined as a dog independently and correctly recognizing and alerting to target clippings at least 80% of the time. In trials, all dogs performed at 100% indicating a high rate of odor recognition. Additionally, an optimal level of performance was expected as a dog independently and correctly *ignoring* blank or non-target boxes greater than 80% of the time (i.e. no more than 20% 'false responses'). In trials, it is possible for a dog to make more than one 'false response' mistake because it could give several false indications during each trial. Here, three dogs falsely responded to empty or non-target object jars/blocks, however, their rate of 'false response' errors was low ranging between 2.5 and 10% compared to the maximum allowed to be considered optimal performance. Interestingly, only one dog falsely responded to a non-target object, while two dogs falsely responded to empty boxes. The number of errors due to 'false response' mistakes can be decreased through training corrections. However, it is important to note that such mistakes can be common in odor discrimination work, and need to be adequately addressed both initially and throughout any training program, and especially if errors occur above the maximum level considered for optimal performance.

After completion of odor recognition trials, the next training scenario began and consisted of small area searches for clippings of lupine in an outside setting. The dog was asked by the handler to search an area for target material. When the object was located, the dog gave an indication of locating it through their established alert. A total of 7 repetitions were completed by each dog. Again, during this training, dogs quickly began to demonstrate their recognition of the clippings of lupine as the target scent despite the presence of a large number of non-target scents in the area.

In this third and final stage, a prairie restoration site with naturally growing lupine plants was identified and used for training purposes. Initially, the dog was brought to the approximate area of a natural plant and asked to search for it. The handler assisted the dog in locating plants, and if necessary prompted the dog to perform its alert, until the dogs were able to make a clear association that the scent of naturally growing lupine was the target object. Once dogs showed a clear understanding of the target to be detected, they were they were expected to independently and correctly recognize and alert to natural plants in small area searches. Dogs varied in the number of repetitions needed to fully recognize natural lupine plants as the target object (mean: 18 repetitions, range: 2 – 31 repetitions), but once natural plants were clearly understood to be the target, all dogs proceeded to correctly and independently alerted to natural plants in the remaining small area searches Training and working styles, as well as amount of professional work experience, may account for the variation among dogs.

Overall, dogs required few repetitions, work sessions, and training days to progress to full recognition of natural lupine plants as the target object. In our prior studies where dogs were trained to detect invasive plants, dogs had a more difficult time recognizing the scent of the natural growing plants on the landscape compared to the scent of clipped material, and it required a greater number of repetitions on natural plants than clippings before dogs stopped needing assistance from their handlers and began to

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independently and confidently recognize, find, and alert to the target plant in small area searches. However, once dogs made this association, their performance in detecting live plants on the landscape proved optimal and they excelled in subsequent field trials achieving high rates of accuracy and demonstrating great detection distances.

Future Plans

In Spring 2008, three or more dogs trained in this pilot study, and potentially one or more newly trained dogs, are expected to participate in the second phase of research with the following objectives: 1) test different search protocols to develop the most efficient methods for utilizing detection dogs in searches for rare plants, and 2) conduct blind experiments to compare the accuracy and efficiency by detection dogs to that of botanists trained in survey methods for rare pairie plants. Based on the results of this phase, we predict that the use of dogs to assist in rare plant surveys will have a high potential for success and that detection dogs will contribute to conservation efforts for rare and threatened plant species.

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