DEVELOPING AN EDGE TO THE FUTURE
HELICOVERPA ARMIGERA PUPAE DETECTION DOG PROGRAM

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Abstract

Cotton Research and Development Corporation is exploring the possibility that a trained sniffer dog may be able to assist in field operations testing for Helicoverpa Armigera pupae. The basic concept is that a suitable sniffer dog candidate be sourced, raised and trained to identify these cotton pests whilst in the soil so that field examinations for Helicoverpa Armigera may be streamlined and establish the level of infestation and what action is needed for the level established. It is envisaged that the dog would not have to do broad acre searched but rather spot searches aimed at establishing the number of pest inhabiting a smaller test area. Should this concept reach full operational field use; it has the potential to save extreme amounts of resources and funds.

Introduction

The basic theory to training a dog to detect any substance or object is quite simple, but there are many steps involved in producing a reliable dog that consistently produces field results. The first step in the detection dog process is to decide if a puppy or an adult dog would be better suited. Both have their merits and demerits. Puppies can be raised to have the best detection dog upbringing but will not be operational until at least 14 to 18 months, whilst an older dog can be trained almost immediately after it has passed it's selection criteria. The puppy option is preferred in most cases by the Author as all the imperative critical stages in the pup's development can be correctly targeted and managed such as the correct and most opportune time to split the pup from mother and siblings ensuring it does not suffer from psychological effects in later life. The puppy option also allows the ability to best socialise the puppy to target all things that could be needed out of the adult detection dog such as to not be distracted or aggressive to all types of live stock and not to be fearful of farm machinery or to be distracted by native fauna.

Building Natural Drives and Instincts and Motivators

It is this Authors preference to use retrieving or spaniel breeds in most cases over the guarding or utility breeds as the retrievers often possess a more reliable retrieve or play drive which is far easier to manage in a open area detection dog job than that of a utility or guarding breed whom are much more prevalent to possessing natural drives derived from the prey range which often manifests into a strong desire to hunt small prey which can be very stimulating to highly prey driven dogs hence dropping field reliability results. When assessing candidate puppies we desire pups that have a pronounced level of play and retrieve with a minimum level of possession so when a toy is thrown out they strongly chase it but want to return it to the handler to elicit more play. Food drive is also another desirable trait to have in a candidate pup as this can also be a great motivational tool which can be used to train a detection dog but it must not be so strong as to entice the dog to elevate to food possessional aggression or that would act as a distraction so the dog loses the cool calm and collective ability to focus on a search pattern or area.

Selection Criteria

A set of tests are carried out to test the pups for desirable natural attributes and to ensure they are not of too hard character to be usable and will develop overly dominant characteristics and behaviour. Too soft characters always run the risk of not being strong enough in character to handle the stress of an ever changing job in all weather, terrain and environments or just developing fears of phobias should they receive a negative situation in a work mode hence destroying the entire program. The desired character is one that is slightly above moderate so that it can handle a reasonable amount of stress without breaking down. This would closely coincide with an above moderate pain tolerance which would coincide with a reasonable workable dominance level that if correctly identified and managed would not be too hard for the average dog handler to deal with so that there is a low probability of unwanted behavioural problems later threatening the dog and program's longevity and success rate. For a young puppy to hold the desire to play for up to 5 minutes or longer would be a great starting point and then we test intensity and desire to conclude a search for the favoured toy or food thrown out away from the pups with the wind blowing from the favoured item down to the pups. Putting the favoured item in a position that would allow it's odour to drift to the pups but so they could not gain possession of it will allow the tested to document how long the pups will hold focus on trying to gain the favoured item. A pup that has all the aforementioned traits and is so driven that it assertively scratches or bites at the location of the favoured item is displaying good natural abilities for an active response dog.

A suspicion test is necessary to ensure the dog will not be easily frightened or put into a fear-based aggression. This is best done using props of several types such as big floppy jackets and large unusual types of hats and big sunglasses and then displaying sharp and suspicious body movements. A pup that is not threatened and will always readily approach would be most desirable.

Sound Sensitivity and Startle Test – This should be done in two different ways – one with many different noises such as noisy kids toys and portable smoke alarms and the other with sharp cracking type sounds such

as a cap gun or small whip cracking and in both the pup should recognise a noise was made but not be at all worried by it and can even show an inquisitive response and be keen to investigate the source.

Visual Startle Test – This can be done with an automatic opening umbrella or even a quickly inflated plastic shopping bag, both will also cause noise so this is why sound sensitivity is tested first again. A non-fearful confident response is most desirable.

Just to ensure the pup is really play driven and not prey driven, it is always important to test the pups for predatory instincts by dragging a piece of cloth along the ground and seeing if they chase it, bite and head shake with it in their mouth in a tug of war manner. If this display is present, then you need to allow the pup to win it's prize so you can move to the next phase and observe if the pup tries to lay over it and display guarding or even if it has defence drives and tries to bite your hand if you try to take the guarded cloth. If the pup does not display predatory or guarding it will not have a strong defence drive and this only confirms it is more so play than prey driven.

After all the tests are successfully passed, it is time to start building the desire to play by recognising how many retrieves the pup will perform and always ending the game short of the maximum amount so it always is left desiring more play and carefully increasing the number of retrieves and the dog's desire to play. Once the dog is strongly driven to play, we can now start the process of Olfactory Imprinting Stage. This is where we impregnate the dog's primary play toy with the odour of Helicoverpa Amigera or one of it's by products so when the dog is properly imprinted it will locate the correct target. We then go through the process of exposing the dog to the impregnated toy enough times in vigorous play with high motivation until the dog recognises that if it uses it's extreme sense of smell, it can locate it's toy faster than using it's eyes. At this point we start throwing the toy into long grass and bushy areas slowly progressing so the dog has to work longer and harder to make a successful find. Whilst the dog is building it's search intensity a method used to lengthen search times is to have a person hold the dog and the trainer goes out into a bushy area and teases the dog with the toy then throws it out then the dog is released and commanded to locate the toy. This causes the dog to search longer and harder due to its field of perception being on 2/3 of where the toy actually landed. Once the dog is extremely proficient at this phase and it's search patterns are greatly building also the trainer goes out before bringing the dog out and places out several toys in spots utilising the wind to advantage then the dog is brought out on the field and teased with an unloaded toy and a pretend throw is performed and the dog sent out in a slightly different area to where the actual loaded toy was located. This allows the trainer to start directing the dog to search and then the dog will make the find after searching a small clear area and being directed into the area where it's scented toy is located and being able to gain a reward via playing with the handler. This process is repeated many times and made harder causing the dog to search longer to receive the find and reward, then the dog can be directed to search from a cold start and make a find. This is started with short easy searches to again build the dogs trust in the handler's ability to help it locate the toy and it's find. This process is ever increasing and can have multiple finds now built in to build the dog's intensity and search pattern. Once the dog has reached proficiency, it is time to teach it a detailed search and scratch indication. This is done by having the dog watch the handler go out and place the toy just slightly out of view from the dog under some longer grass so it is completely hidden from site and the handler then releases the dog and commands it to search. This entices the dog to now totally trust its nose to gain the toy and be able to start the self-reward process of play with the handler. At this point we also introduce contamination and walk all over the area and touch and disturb many locations around the search site so the dog can not simply learn to track where the trainer has walked and finally touched and disturbed hiding the find for the dog. This will be done for the rest of the dog's working life so that it will only receive reward from the area that is emanating the desired odour and not just the ground disturbances or the handler's scent. We can now start to hide the loaded toy in gravel as this has a nice free flowing air space between each small stone and can easily accommodate a deeper harder find for the dog building it's desire to dig to gain the toy and hence making a stronger active indication that is very easy for a new handler to identify and work with.

Now the soil transition phase is necessary due to this being the dog's required search environment so when the dog has a constant strong intensity to search and focus and a strong desire to destructively scratch to gain the loaded toy, we now start to hide it in soft soil slightly down deeper than the depth a pupae would normally be located. We must ensure we take great precautions to put down many unloaded ground disturbances so the dog is absolutely sure to only locate odour and can not gain reward from merely sniffing for a ground disturbance made by a handler or helper. During this phase we also make dozens of disturbances and place in just one a loaded toy and leave them for several days or even weeks in some cases

depending on the longevity of the odour base. This allows use to further ensure ground disturbances are not a factor to the dog's successful finds. Once this phase is covered we incorporate multiple hides so the dog will increase the number of searches before needing to be rested. This also increases the dog's desire to strongly search and indicate. Now it is time to throw in as many distractions as you can think of starting of with less stimulation and when the dog is totally competent increasing the level of distraction and stimulation and contaminations. Once the dog is totally reliable at making finds in all possible environments and situations, it is time to start training the handler in how to work with this dog's natural abilities in a field ready successful team.

Conclusion

The canine possesses one of the most sensitive olfactory abilities of the entire animal world and is arguably one of the most trainable animals known. To utilise these factors and the fact that most living entities possess an individual scent, which is particular to their species, the probability of an environmental detection dog to locate Helicoverpa Armigera is highly probable.

Similar dogs have been trained to locate environmental pests such as Red Imported Fire Ants and Screw Worms. Dogs are being successfully used to locate pesticide chemical residues in soil at a rate of below one part per million with a success rate of approximately 98.9%.

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Craig was contracted by the Department of Primary Industries, Queensland, to develop two world first Chemical Residue Detection Dog Programs, to train the dogs to performance specification criteria and then develop a training program for handlers to operate and maintain those dogs. He is also Chairman and Chief Trainer of ASDA – Assistance and Service Dog Association. This non-profit organisation breeds, raises and trains dogs to assist disabled people to gain a greater level of public access and quality of life through utilising the dogs ability to assist them with retrieving dropped or wanted items not able to be reached, indicating visitors to the door, alarms or phones ringing etc. and even indicating oncoming seizures. Craig has also previously been hired and utilised by five State Police Departments for specialist dog skills in cadaver recovery and search and rescue. He has also been a permanent part-time lecturer for the Queensland University Veterinary Science School for ten years and has authored hundreds of articles on specialist dog work.