Preliminary Laboratory and Field Trials of the Chemical Repellent Synergised Ammonium Aluminium Sulphate on Rodents and principally Birds.

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May 1978.

At every meeting of this Committee since its inception great emphasis has been placed by all delegates on the overwhelming importance of reducing bird strike by removing birds from airfields and their surrounding areas. Unwittingly much has been done in the past to encourage birds to these areas such as crop planting. Airfields and their associated buildings are in many respects a haven for many species of birds, large expanses of short herbage provide safe roosting and often areas between runways are sown with cereal crops which provide food for granivorous birds and the small rodents found within these areas provide food for birds of prey. Refuse tips are often situated near airfields and these attract scavenging birds such as Black-headed Gull (Larus ridibundus).(Stone '77) The hangars and other buildings provide roosts and nest sites for birds such as sparrows(Passer spp.). Many methods of control have been tested usually with little success- bio-acoustic scaring, gas cannons, and the use of trained birds of prey all have their limitations. However, at Ben Gurion International Airport, Israel, a degree of success was achieved with the chemical repellent Synergised Ammonium Aluminium Sulphate(referred hereafter as SAAS).(Dar 1977).

I have included research which is particularly relevant to these problems. Attacks by birds on commercially grown crops are comparable to the problem of birds feeding on airfields. The problem of birds in hangars is similar to that found in many farm outbuildings. I have carried out a number of trials on rodents and the results indicate that rodent populations can also be controlled.

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Observations of bird movements on treated areas are encouraging-SAAS appears to have, to some degree, an effective repellent action. Quantitative results from most of the field trials are not currently available as much of the value of SAAS cannot be assessed until harvest.

A fruit farm near Rochester, Kent suffers, as do all fruit farms, from bird damage particularly sparrows (Passer domesticus) damaging the flower buds of gooseberry (Ribes) bushes.

As soon as damage was noticed this year on 10 April an area of 30m x 10m was sprayed with SAAS in solution with an emulsion adhesive. The gooseberry field, in all 0.5 hectares, is bordered on two sides by mature orchard, on one side by a dense hedge of Leyland Cypress and on the fourth by a damson (Pruhus) hedge 5m high, behind which lies a footpath and an overgrown bank 2m high covered with nettles (Urtica), brambles (Rubus) and elders (Sambucus).

Most of the damage is confined to the corner bordered by the hedges and this was the area sprayed. It was decided to spray alternate rows as a light breeze carried the spray onto adjacent rows. In all 4 rows of 21 bushes each were sprayed effectively treating 7 rows.

The results of this trial can only properly be assessed by comparing the yield of the treated bushes with that of the untreated bushes. Reports of observations by the farmer and his staff however show that overall fewer birds were seen in the field than before the application and fewer birds were seen in the treated area than in the untreated area although the treated area was the one normally visited.

Observations by me 27 April, 17 days after the application showed that the repellent was stillv visible on the leaves. I observed the field for two hours and noted that birds still flew into the field from the hedgerows but flew over the treated area and settled in the untreated area.

At the same farm an area 100m x 28m surrounded on 3½ sides by mature orchard andt the remainder by farm outbuildings was sown with Beetroot (Beta). On 11 April the farmer noticed that sparrows were damaging the emerging plants. The area was then sprayed with SAAS once around the perimeter and in two bands across the field. The width of the spray was 2m. After spraying damage ceased. Unfortunately no control was left to assess any repellent action. However, the sparrows were still present in the area and I feel that it can safely be assumed that there was a degree of repellency.

An open fronted concrete and asbestos store shed (approx 8m x 15m x 6m high) at this same farm in Kent, is used throughout the year by House Sparrows and up to IO Starlings (Sturnus vulgaris), as a roost. In the spring and summer sparrows regularly nest under the corrugations in the eaves and over the joists. The shed is used to store apple boxes throughout the year and the bird droppings constitute a health hazard.

On IC april this year one quarter of the roof was sprayed with SAAS and the remainder left as a control. The farmer regularly observed the shed particularly at dawn and dusk and for 5 days no birds were seen in the treated area of the roof and fewer birds were seen overall. Gradually up to 5 birds roosted in the treated area whereas up to 25 had previously been seen. On 9 May the sprayed area still contained fewer birds approx 5 than the untreated area where 25-30 birds were regularly seen. A nest with eggs which had been sprayed had been deserted.

A new method of treatment is now beibg tested in this building as much of the spray runs off the non-absorbent concrete and asbestos. Strips of foam soaked in the solution are tied to the joists to keep the repellent in the area to be treated. Results are not yet available.

A farmer in Nottinghamshire suffers a minimum of 20% loss on his radish (Raphanus) crops sown in succession throughout the summer months, usually 4-5 separate sowings.The plants are damaged at emergence by up to IOO greenfinches (Carduelis chloris) and house sparrows and also by chaffinches (Fringilla coelebs), linnets (Acanthis cannabina) and skylarks (Alauda arvensis). This damage has continued for 15 years.

A survey of the extent of crop damage when protected by various bird-scaring devisees is beihg undertaken by the Pest Infestation Office, Ministry of Agriculture, Fisheries and Food, Nottingham. A gas cannon and a gas-operated scarer which throws a brightly painted metal flag 10 metres up an aluminium pole have been tried with little success. In fact with these devices used together they were found to be effective up to IO metres, beyond this range the birds were simply disturbed and settled a few metres away. Red and white tapes held off the ground so that they flicker in the wind and black cotton are al also being evaluated.(Jones pers comm.)

A strip of ground 100m x 5m was sown with radish seed treated with SAAS seed dressing powder on April. Random plots were were covered by bird proof cloches as controls. No data will be available to assess the effect of SAAS until harvest but observations by a staff member of the Ministry of Agriculture state that for the first three days no birds were seen on the plot and the numbers of birds present after that date were 'significantly less than expected' (Jones pers comm.)

A mouse when confronted with new stimuli such as when it is placed in a different cage will advance within the boundaries of its senses-sight, hearing, touch, taste and smell- if the stimuli are judged safe it will advance. The normal reaction of a mouse to SAAS in dry powder form are as follows (defined by observation of 30 individuals). When confronted with SAAS, which is thought to act on the senses of taste and smell, (Stone??) [illegible] and sniffs vigorously, it will often sneeze, the eyes may run and the animal shows signs of fear and or agitation - higher metabolic rate, defaecation, and rapid movements. On retreating from the direct area of SAAS a series of bouts of grooming takes place particularly around the head. Certain mice have been observed to suffer discomfort - turning around sharply a number of times to groom the rear and showing signs of agitation- if particles of the dust adhere to the skin during and after urination.

A number of mice were kept without food for 3 hours and then offered a food pellet treated with SAAS. The initial reaction of all the mice showed the same general pattern. They all showed caution which ranged from a few tentative sniff and retreating to walking around the food dish a number of times. The mouse would pick up the pellet in its teeth and nibble at one end. No immediate feeding would take place but a series of cautious 'tastes' took place which lasted [illegible] 2 mins to 4½ mins before any determined feeding took place. All the mice removed the outside of the pellet and ate the inside core. In all cases the discarded outer layer was not consumed even though the mice had had well below their normal food intake.(Determined by experiment to be 0.2099 gms per hour over 24 hours).

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Ten mice, kept without food for 5 hours, were offered one treated and one untreated pellet. In all cases the untreated pellet was favoured, removed from the dish and eaten. Six of the mice then removed the outer layer of the pellet and ate the core. No individual ate the outside of the treated pellet and they all eagerly consumed an untreated pellet at the conclusion of the experiment 2 hours later.

The repellent SAAS has been used in many countries throughout the world to attack many vertebrate pests(Stone 1977). Very few have been correctly monitored by scientific bodies and the trials described in this paper represent the start of a series of experiments to be carried out to provide accurate data to assess the efficiency of the repellent Synergised Ammonium Aluminium Sulphate.

Acknowledgements.

I thank the staff of the Froebel Institute and Digby Stuart College, Roehampton Institute of Higher Education for allowing me to use their facilities. Dr. Adrian Bonner, Dr.Audrey Harvey and Peter Shaw M.Tech. for their tutorial help and encouragement. Maurice Wright Of Perry Hill Farm, Cliffe,Kent and P.Hammond of Spring Farm, Nottingham for allowing me to carry out field trials on their farms.Sphere Laboratories(London) Ltd., for providing SAAS at no charge.

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