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The Desert Locust Control Organization for Eastern Africa (DLCOEA) and its Background [and Discussion]

Adefris Bellehu, J. W. S. Pringle, H. D. Brown and R. C. Rainey

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The Desert Locust Control Organization for Eastern Africa (DLCOEA) and its background

By Adefris Bellehu
Director, DLCOEA, Addis Ababa, Ethiopia

Up to the mid 1940s, when the Desert Locust came to Ethiopia, hardship and famine were inevitable, for there was no effective defence. Then arsenic in bran bait made a beginning but was often too late to save the crops; BHC in bran bait in the early 1950s was a big improvement. Since then, understanding the significance of atmospheric movements, use of aircraft, ultra-low-volume spraying with new insecticides (especially dieldrin for hoppers), new spray equipment and new tactics have provided means of effective control.

The Convention of 1962 signed by the governments of Ethiopia, France for Jibouti, Kenya, Somalia, Tanzania and Uganda, and later Sudan, provided the political backing for the methods to be applied. In 1968 a sudden upsurge of locusts was completely controlled and the permanent organization DLCOEA remains ready.

1. Narrative

My first introduction to Desert Locust control was in 1943, as Field Assistant to David Buxton from the Anti-Locust Research Centre; by 1958 I was Director-General of the Ethiopian Plant Protection Department and now I find myself Director of DLCOEA, which covers the seven countries in the horn of Africa. My concern with locusts goes back even further, however, to my childhood in the early thirties when as a lad I lived in Harrar in eastern Ethiopia. There the arrival of large locust swarms would mean empty stomachs in the following months and years, often leading to full-scale famine. So I have lived through and taken part in the whole course of development of Desert Locust control in East Africa.

Years of good rainfall are normal in the high plateau of Harrar, and growing millet waving in the afternoon breeze on the terraced slopes is a truly beautiful sight. Then, as I remember it, huge migrating swarms quickly and completely eclipsed the afternoon sun and darkened the countryside. As children, we were quickly called out to make the traditional high-pitched cries, beat drums and make smoky fires to scare away the locusts; but all we ever achieved was to chase the pests on to our neighbour's crops, which gave but a short respite, for the wind quickly brought more of the enemy and in the end the locusts always won.

As religious deterrent, there were church services and ceremonies followed by high-voiced musical prayers, which to us children were enchanting but gave little hope of saving much of the crops. In those years, the invading locusts were known as 'the horses of the wind'.

As a result of the First International Anti-Locust Conference held in Rome in 1931, all governments were invited to cooperate in the control of Desert Locusts by sending regular reports to the Anti-Locust Research Centre in London.

Buxton was then stationed in Ethiopia and he organized groups of people, in which I was included, to accompany him to arrive in towns on market days, to collect data on past locust invasions from farmers coming to market. They would tell us recent locust news and recount their experience of damage to their crops as far back as they could remember. It was our job to

translate and edit these reports for onward transmission to the Anti-Locust Research Centre in London. These reports helped to build up a preliminary picture of the seasonal cycles of breeding and migration of each species; these were plotted on maps, month by month. We also made ground surveys trying to delimit areas of both adult and hopper infestations and their sources of origin, so that the London Centre could give warnings of possible invasions by swarms.

My early personal experience of organized Desert Locust control was in the winter of 1944. After a course of training at Wad Medani in the Sudan, we were sent to the Tokar Delta on the Red Sea coast where control operations were in progress using arsenic in wheat bran. The toxic effects of arsenic to human beings were well known and before starting work one had to soak one's arms in engine oil up to the elbow, then mix the arsenic into the bran by hand, with water, until it was well mixed and wet enough to seem to us to be attractive to locusts. Baiting was carried out in the early morning, when the hoppers were forming basking groups, ready for their marching to start; thick lines of bait were laid across the expected line of march and there the hoppers stopped and fed.

The next insecticide introduced for baiting, in 1949–50, was a great step forward and is still used today. During its introduction I shall never forget tasting and eating the bait myself to convince the owners of camels and cattle that it was harmless; then they would let us use it on their lands. My colleagues – who did the same – and I all survived this demonstration with a persistent organo-chlorine insecticide, and as you see I am in good health even now, 27 years later.

This was BHC, and 5% of the formulated dust in bran was a most efficient and quick killer of locusts, both hoppers and fledglings, giving striking results. Unfortunately bran bait had one great disadvantage; during the large-scale operations of the short-rains breeding of 1953 and 1957, over 80000 bags of bran of 50 kg each were required each year, with a haulage round trip of over 700 miles, which was costly.

After trials with several power-spraying machines and hand sprayers, the exhaust-nozzle sprayer was developed by John Sayer, a real locust scientist (*see* p. 431). This was a genuine innovation in ultra-low-volume spraying technique, using very small amounts of dieldrin sprayed on the vegetation on which hoppers would feed, at last cutting out the great haulage and labour problems of baits. As Dr Gunn has described, dramatic improvements had also been made in the use of aircraft as an effective weapon in the control of flying and of settled swarms and of large-scale hopper infestations, by the use of the micronair spray gear and suitably formulated ultra-low-volume insecticides.

The new methods of control, now very effective, have, however, brought new problems, mainly concerning their persistence in the environment. Some want persistent locusticides such as BHC and dieldrin to be phased out and replaced by alternatives that should have the same effectiveness but be non-persistent, if this is possible. Later in this meeting, R. D. MacCuaig of the FAO/SIDA Project, which is housed in our Headquarters at Addis Ababa, will discuss this very question and also explain our early warning system to enable excessive exposure of any of our staff in the field to be recognized.

These advances in our knowledge have depended on scientific help and on organizations that supported that help: I note with pleasure in the audience many who have helped in one way or the other, sometimes both, as Dr Rainey, Mr Joyce (first Director of DLCOEA), M. Roy (FAO Locust Expert), Dr Gunn, now retired, and Miss Zena Waloff, Miss P. Ellis, Dr Haskell and others at C.O.P.R.

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During the locust invasion of 1958, the northern and eastern provinces of Ethiopia were infested again with numerous swarms and followed by large-scale breeding. An extensive control campaign was launched by the Ethiopian Government with the help of the Desert Locust Survey and FAO, using an emergency call-up of all peasants, farmers, the army and the air force.

Even after this big effort, several thousand tons of cereals were destroyed, an estimated 15000 lives were reported lost, and there were shortages of food for two years, necessitating requests to friendly nations to supply food. This had to be delivered in Eritrea, Wollo, Tigre and Harrar Provinces of Ethiopia at a cost of millions of dollars for transportation.

From 1910 to 1969 there were four widespread plagues with five recessions lasting each four to five years; if one considers 1967–9 as a fifth plague of the Desert Locust, it has been the only one that has not caused widespread and known damage; the reason was that member countries were by this time well organized to meet the plague by using u.l.v. methods of control against both swarms and hoppers, by combined air and ground tactics over vast and difficult terrain in East Africa.

2. Regional organization and action

Before DLCOEA came into being there existed its predecessor, the Desert Locust Survey, and I must acknowledge the foresight and policies of its Directors, first P. R. Stephenson, C.M.G., O.B.E., and then R. J. V. Joyce, who followed him and did so much to prepare the organization to meet its coming great trial in 1968.

The political evolution of Africa and the inevitable withdrawal from Desert Locust Survey of direct financial support from Her Majesty's Government made necessary the creation of a successor body to inherit the duties, property and experience of the Desert Locust Survey, but constructed on an international basis. A Convention establishing the DLCOEA was finally ratified and signed in Addis Ababa on 22 August 1962 by representatives of Ethiopia, France (for Jibouti), Kenya, Somali Republic, Tanzania and Uganda. Later the Sudan acceded to the Convention (1967).

The Contracting Governments decided to establish headquarters at Dire Dawa, later transferred them to Asmara and then to Addis Ababa. There was a main operational base at Hargeisa, Somali Republic, and there were various control reserve bases at Dire Dawa, Asmara, Nairobi, Mogadiscio and later Khartoum, Dodoma and Kampala.

Many changes have been made since 1962. In addition to constant locust surveys and small-scale hopper-control measures, which occur every year in the winter breeding areas of the Red Sea and Gulf of Aden coasts, we have also helped with control measures in Saudi Arabia and the Peoples' Democratic Republic of Yemen. More recently our Council of Ministers has allowed us to use any spare aircraft flying hours to help member governments in aerial control operations against *Quelea quelea*, tsetse fly and armyworm, which have kept us busy.

At the recent 22nd Session of the Council of Ministers held in Nairobi in mid May, the Organization was commended for its work and the Council showed its appreciation by accepting our Programme of Work and Budget for 1977–8, which is now running at U.S. $1900000. All contributions are now fully paid up.

We employ 260 permanent personnel of all grades, from pilots, aircraft engineers, administrators, radio engineers, vehicle mechanics, storekeepers, an accountant and auditors, to scientific research staff and field supervisory staff on whose resourcefulness and hard work the

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whole success of the Organization depends. Our aircraft consist of five DH Beavers, one BN Islander and one Cessna 185; a further two Islanders were expected in July 1977. We hold 130 vehicles, including about 60 survey vehicles fitted with exhaust-nozzle sprayers, and 30 v.h.f. s.s.b. radio sets, so that our aircraft, field teams and bases are in constant communication. Our insecticide holdings amount to a one year supply for the normal breeding seasons and at the beginning of June 1977 amounted to 470000 l of fenitrothion, dieldrin and BHC formulations, which are stored at strategic points throughout the region.

So we are a modern organization, equipped and trained to go into action and to destroy any invasion of our old enemy, the Desert Locust.

Discussion

J. W. S. Pringle, F.R.S. (*Department of Zoology, University of Oxford*). What control operations has DLCOEA undertaken recently against pests other than locusts?

B. Adefris. During the past year DLCOEA has undertaken aircraft spraying against weaver birds in Ethiopia, Kenya and Tanzania, and against banana leaf-spot in Somalia.

H. D. Brown (*RLCS, Pretoria*). While aircraft are indeed unsurpassed in the actual control of locusts, I would like to enquire as to experience of the role of aircraft in the survey and detection of pre-swarming infestations of Desert Locusts, especially if these are done unaided by ground support.

R. C. Rainey, F.R.S. Isolated day-flying Desert Locusts are readily seen and reported by aircraft; and George Popov has repeatedly shown how the location of patches of green vegetation from the air can help in the subsequent discovery of scattered locusts on the ground in these patches. With airborne radar and wind-finding equipment, one would expect air reconnaissance for low-density night-flying locusts to be as effective as it has been found to be for spruce budworm moths (pp. 460–465).

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