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Training: The Missing Link in Pest Control [Abstract Only and Discussion]

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Training: the missing link in pest control

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[Abstract only]

Today when scientific development has so much to offer, the Desert Locust still poses as much threat to many parts of the world as it did many decades ago. When I was first exposed to aerial control of Desert Locust in the late 1960s, everything was being done to tackle the problem scientifically, with a collective and Regional approach. However, the recent past points towards a negation of this, because of a total disregard of the necessary manpower training. Unless a remedy is found soon the war will be won by the pests.

Because of the long intervals between plague recurrences, usually 7–10 year lapses, those involved in locust control either retire by the next time around or just completely forget reading through the amount of ample literature available to update their knowledge. There is no effort to conduct refresher or mock exercises during recessions because it is assumed that anyone can fight the threat as the locust has been with us from time immemorial. There must be an effort to conduct symposia on locust control as there are on other migratory pests, which would involve people in real field work. Great emphasis must be laid on training and planning must begin for future needs in the effective control of all migratory pests by: (*a*) training of aircrew; (*b*) scouts, drivers and ground support.

The assumption that anybody with a flying licence or anyone who sits in an aircraft can identify a locust is a fallacy, as regards aerial control and observation. Training is the most potent instrument in producing a confident airman capable of conducting a serious campaign against a locust plague. Safe and efficient operations in this kind of flying can only be delivered by properly trained crews, as experience has shown. It is only a properly trained pilot who is likely to prevent pollution of the environment by avoiding overkill. Scouts and ground-support training is vital for a successful campaign. There is every danger of causing harm to human and animal life, as well as the environment, by using untrained personnel. A major cause of unnecessary wastage is often untrained manpower. It is therefore impossible to put enough emphasis to manpower training.

In an area covering over 6 million km^2 with a population of about 121.5 million in eastern Africa, one may be hard-pressed to find 30 properly trained locust scouts today. A properly trained scout and driver would be a great asset in such a vast and inhospitable region, as he may be the most likely person to recognize the onset of an infestation. It is also very important for every administrative staff member to appreciate the enormity of all the elements involved in conducting a successful campaign. It calls for dedication and involvement. Looking at and considering the vastness of the locust area, one question comes to mind. What is the most effective way to combat the menace when it occurs? Aerial control is the answer. But, faced with the present types of aircraft, one sees a big gap between available migratory pest control aircraft and our future needs. The typical agricultural aircraft is inadequate. The converted models of normal utility aircraft cover some role but are still unable fully to meet our needs.

There is therefore a great need for all of us; operators, manufacturers and researchers, to make a concerted effort to develop a suitable aircraft. An aircraft to

cover the long distances fast enough not to miss the target, to be capable of carrying sufficient loads to control an average sized swarm without having to return to base for reloading, and yet be manoeuvrable comfortably, working from poorly maintained airfields and strips and be economical to run. We will need to fit the future aircraft with very advanced navigation equipment to enable more accurate long range survey and control. Presently, there are no such aircraft on the market.

Discussion

N. Kinvig (*CKS Ltd, Southend Municipal Airport, U.K.*). I have to congratulate Captain Kitenda on his very good talk. I agree with what he said about training being the most important subject. Proper locust pilots are becoming like Dodo birds, extinct. So something has to be done. I think that if the average experienced agricultural pilot is put into the field for locust spraying he won't know what to do, but it is very difficult to train when locusts are not present. However, the average agricultural pilot can make a good locust pilot if he has a good observer. As Captain Kitenda said, if you don't know what you are looking for you won't find it.

I don't entirely agree with Captain Kitenda's comments on the unsuitability of aircraft types. Some of the present aircraft are suitable, but I agree that a lot of the purpose-built agricultural aircraft are not. If they are loaded up, as the manufacturers suggest, then you can't fly more than 50 or 60 feet above the ground with a full load, so I think it will be necessary to use utility aircraft. I know it is a compromise, but to develop an aircraft totally suitable for locust spraying is out of the question. So, in conjunction with the new ideas on radar, we have to look for aircraft with a reasonable range and good manoeuvrability. Of existing aircraft, single-engined aircraft of the turbo-prop type such as Pilatus–Porter or Beaver, converted to turbo-prop, would make ideal aircraft for the purpose.

R. J. V. Joyce (*Cranfield Institute of Technology, Bedfordshire, U.K.*). Captain Kitenda, with his great experience at the sharp end of locust control, has ably directed attention to the increasingly large gap that exists between those who see insect pest species as ones whose behaviour and sudden changes in numbers and location is of exceptional scientific interest, and those whose job it is to prevent crop loss. It is often forgotten in the scientific world that money is allocated to research into pest biology in the expectation that this will lead to saving crops from damage. In my view, the development of locust control has been successful because most of the knowledge concerning locusts was derived from questions raised by the needs of control: such as where have the swarms come from, where will they be tomorrow, and how can I transfer enough insecticide, with minimum waste, in the time they are in range, to destroy the bulk of them? It was questions such as these that generated Dr Rainey's convergence hypothesis, that have enabled locust populations to be studied quantitatively, and that stimulated search for an understanding of the physical principles which determine how efficiently insecticide released from an airborne tank can be transferred to its site of action within the locust. For several decades in the past, research workers have worked hand-in-hand with those engaged in control, to their mutual benefit. It is sad to learn from Captain Kitenda that this is no longer so.

Captain Kitenda is right to stress that it is a fallacy to assume that a flying licence is all that is necessary for successful survey and control of locusts, and recent experience has shown that this assumption has led to gross inefficiency and horrific environmental contamination. With no means of checking the efficiency of kill, it is impossible to establish whether the emergency

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use of even experienced crop-spraying pilots, paid as they are by the size of the area they treat, has been cost-effective. Locust survey and control is a highly specialized job that demands experience, skill, dedication and courage. Moreover, it also requires expertise in the use of instrumentation rarely employed in agricultural work. We are fortunate in having with us today a pilot who has been a pioneer in the development of the use of navigation systems for track guidance of agricultural aircraft, Noel Kinvig with recent experience in locust control, and I am sure he will agree how important is such instrumentation.

What, I think, is needed to surmount the difficulty to which Captain Kitenda has drawn our attention, namely the intermittent nature of locust upsurges, is the formation of a 'fire-brigade' unit, consisting, perhaps of no more than two aircraft, flown by an experienced crew under the flag and general direction of FAO; during recessions, conducting surveys for swarms in the most suspect areas, and, during upsurges, providing assistance to local control teams and training and updating aircrew in control techniques.

J. D. Gillett (*London School of Hygiene and Tropical Medicine, U.K.*). Captain Kitenda makes a plea for new types of aircraft for anti-locust work; has he, I wonder, considered small modern airships? Airships have several advantages over both helicopters and fixed-wing aircraft: airships are cheap both in initial cost and in operation; airships have considerable superiority in endurance; airships can carry a far greater payload; airships can operate from poorly maintained or even non-existent airfields.

A high technology airship with an endurance of between 20 and 30 h and with sophisticated navigation and advanced radar, such as Airship Industries' SK600 class, would, I understand, cost in the order of £2 000 000; a smaller, low technology airship with an endurance of some 3–5 h, such as those now being offered by Thunder and Colt, would cost about £300 000.

The disadvantages of airships for this sort of work are: (*a*) their relatively slow *economic* cruising speed, limited to between, say, 65 and 40 km h^{-1} (although the larger ships could have a sprint capability of somewhere well over 100 km h^{-1}) and (*b*) the necessity for a relatively large handling crew; both disadvantages are offset by the superior flight endurance and payload.

Finally, most of the locust problems that we have been discussing involve desert or semi-desert regions. If we move with the times and consider a solar powered airship (as at present under serious consideration at Imperial College), then the advantages in these sunny regions would be even greater. An airship, with its relatively huge surface area, is ideal for this type of development.

G. H. Lee (32 *Moreton End Lane, Harpenden, U.K.*). As an Aeronautical Engineer by profession, I was interested in the remarks made by Captain Kitenda concerning desirable aircraft characteristics. It is obvious that more than one type of aircraft would be needed: in addition to the 'strike' aircraft of short range suggested, there is also a need for a long-range aircraft for transport and survey duties.

I was surprised at the preference shown for single-engined aircraft. If aircraft cost was the deciding factor, I would have thought that the avoidance of a forced landing due to a single engine failure was a desirable feature of a twin-engined machine and might justify higher purchase and operating costs. Any aeroplane used must be propeller driven to give the operational flexibility required. The fuel type available might be limited and it is for this

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reason, as well as for lightness of engine, that a gas turbine might be preferable. Possible twin engined types might be later versions of the Short 'Skyvan' (the 360 series) or of the 'Jetstream' (formerly made by Handley Page and now manufactured by British Aerospace at Prestwick).

As it is well known for aircraft to fly through locust swarms, they would need special modifications to air intakes (especially engine air intakes) and to oil coolers to prevent clogging by flying insects.

Professor Gillett raised the question of the possible use of airships. As a consultant to an airship company, I would like to point out that despite obvious operational advantages (such as very low flight speed, e.g. hovering), airships are expensive to buy and to operate; the latter would require the services of a ground crew of, say, 10 people, with considerable associated ground equipment (mobile mast, etc.) that have to accompany the airship. This is for an airship having a useful load (flight crew, operational crew plus operating equipment and load, together with the necessary fuel and oil) of about 2500 kg. An endurance of 30 h was suggested; this is possible (and has in fact been achieved when demonstrating the possibility of Channel traffic control to the French Navy), but certification might require a night landing to be done to cope with engine failure; is that possible 'in the bush'?

Regarding helicopters, I agree that they have desirable flight characteristics, but they are more expensive to buy and operate than aeroplanes (and are probably more costly than airships). Their limited endurance and range restrict their usefulness.

R. Le Berre (*WHO, Geneva, Switzerland*). I thank Captain Kitenda for so clearly drawing our attention to the need for training. To give two examples from the experience of WHO: since 1964, more than 160 Africans of high or good standard have been trained in medical entomology and vector control in excellent European and African centres. Only 40 are still working in the field, which means a loss of 75%. The reasons for the losses are the difficulty of working under field conditions, and lack of a career structure at National/Regional levels. By contrast within The Onchocerciasis Control Programme (OCP) in West Africa again, 160 or more people have been trained in all disciplines involved. Most of them are still associated with the OCP because of a good structure, career insurance and excellent, although demanding, conditions of work. So I emphasize the need for providing these as well as training.

D. Rijks (*WMO, Geneva, Switzerland*). At the request of the interdisciplinary workshop on Meteorology for locust control, Tunis, July 1988, a small working group with representation from Food and Agriculture Organization (FAO), the Overseas Development Natural Resources Institute (ODNRI), Programme de Recherches Interdisciplinaire Français sur les Acridiens du Sahel (PRIFAS) and the World Meteorological Organization (WMO), prepared a syllabus for training of observers and operators in acrido-meteorology. I fully support Captain Kitenda's suggestion for training of spray pilots. In fact, many of those involved in the past campaign have indicated the value they themselves would have gained from timely training, as outlined by Captain Kitenda. If it really proves difficult to develop an aircraft that will be able to both prospect and spray efficiently, thought might be given to using a combination of aircraft. Such a combination might consist of a group of five or six spray airplanes and one reconnaissance aircraft, with 10–12 h autonomy and equipped with Global Positioning System (GPS) and High Frequency (HF) communication.

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R. J. Courshee (*The Meadows, Plough Lane, Ewhurst, Surrey U.K.*). It might be clear from our discussions by now that swarm control with chemicals is the main practical way we have of dealing with major locust infestations in 1989. In my view, a bigger missing link in locust control than training, is survey during recession periods. For this, I think, helicopter transport will be needed to enable surveys to be carried out on foot, so I would ask Captain Kitenda to consider the same helicopters for control of these swarms. If such control helicopters were also supplied by a transport helicopter, they could stay with the swarms and get over a main problem of fixed wing aircraft which cannot always stay in contact with them, economically that is, without airstrips and ground support.

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