gated acre. Seven of those ranchers had an assessment of over $1,000.00 with several in excess of $2,000.00 and on up to over five times those amounts. Those who have cattle in the area anticipate increased gains because of reduced mosquito populations.

Bill Dalles said, "If we can get rid of enough mosquitos so they don't chase me into the house when I should be out irrigating and I can do a better job of irrigating and raise one more bale of hay an acre, it will pay for the program."

Countless hours of time and hundreds of gallons of gas were used by the unpaid LLMCA board members in getting a big job done well.

If and when you stop and ask a cooperating rancher if you can fish on his property, and if he asks for a donation of five dollars or so to help fight mosquitoes; remember about the way it was and think about the way it is now, and that thought that germinated for over 6 years.

ALLEGED "RELUCTANCE" OF BOREAL *AEDES* AND *CULISETA* TO TAKE MORE THAN ONE BLOOD MEAL

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McLean (1975) makes the generalization, without supporting data, that in "Arctic America," (defined by him as starting at 53°N), ". . . . virus transmission by *Aedes* and *Culiseta* mosquitoes probably occurs infrequently due to their reluctance to imbibe more than one blood meal during their lifetime," (p. 269). McLintock et al. (1976) refer to ". . . their well-known reluctance. . . .," (p. 236), citing McLean (1975) as the authority.

If boreal *Aedes* and *Culiseta* are reluctant to take more than one blood meal, parous females would rarely if ever be taken biting, and few would complete more than one gonotrophic cycle, or two in species with autogeny. In studies at George Lake (54°N) I have taken many parous *Cs. alaskaensis* (Ludlow) and *Cs. inornata* (Williston) at bait, mostly cattle (Table 1). *Cs. alaskaensis* is univoltine, and the pars taken in July and August were a year old, and had completed at least 3 gonotrophic cycles. A more detailed account of this study is in preparation. Graham (1969) took parous *Ae. excrucians* and *Ae. punctor* in animal-baited traps at George Lake in August. Both are univoltine species, emerging in May and June. Even on Ellesmere Island at 82°N, *Ae. impiger* and *Ae. nigripes* females completed up to 3 gonotrophic cycles in 2 months, (Corbet and Danks, 1973). In the Ivanovskaya district of the USSR (57°N), females of *Ae. cinereus, Ae. cataphylla,* and *Ae. punctor* completed as many as 8 gonotrophic cycles, (review by Detinova, 1968); all 3 species are well-represented in "Arctic America." Autogeny is known in some boreal *Aedes,* but only in the first gonotrophic cycle. *Ae. impiger* and *Ae. nigripes* take blood in the first cycle as well if they can get it (Corbet 1967).

The *probability* of boreal *Aedes* and *Culiseta* females taking more than one blood meal in their lifetime may indeed be low, and the probability of their transmitting viruses to humans still lower, but this is not due to *reluctance* on the part of the mosquitoes. Such mistaken generalizations about feeding habits only obscure the gaps in our understanding of the lives of boreal mosquitoes.

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Table 1. Parity rate of *Culiseta* females collected at bait (mostly cattle), George Lake, Alberta, 1973–75.

Month	*Cs. alaskaensis* Number dissected	*Cs. alaskaensis* Parous No.	*Cs. alaskaensis* Parous %	*Cs inornata* Number dissected	*Cs inornata* Parous No.	*Cs inornata* Parous %
April	53	0	0	0	..	..
May	201	101	50	3	3	100
June	114	114	100	61	61	100
July	110	110	100	264	96	36
August	2	2	100	191	89	47

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STARTING A MOSQUITO CONTROL PROGRAM

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A governmental agency feels they want to start a mosquito control program because of certain complaints received. The first thing they should do is to have a survey made. In Pennsylvania this can be done either by the State Environmental Resources Division or by another county or private concern. The survey can be done in 3 to 4 weeks.

The answer is: they need a program. Where do they start?

They should hire a man with field experience or one who has had experience in entomology or biology. This man should be an aggressive individual. They also need a second man, either part time or full time, depending on the size of the program, who has some mechanical ability. The reason for mechanical ability is that you cannot call in a mechanic or run 60 to 100 mi. to have specialized equipment repaired whenever you have a minor ailment.

You now have a start as far as personnel is concerned. The next thing you need to know is what equipment is needed. The first thing you need is transportation and you must decide how much weight you will be carrying. The most popular sizes are the 1/2 and 3/4 ton stake body trucks with 4-wheel drive. You will now think about a fogger because the complaints are: "the mosquitoes are biting." So you buy either an ultra-low-volume machine or a thermal fogger. Don't make a mistake and buy one too small because you realize you are going to grow. I must stop at this point because there may be contradictions to this starting method.

Many directors, because they are not experienced in the field, feel they must take time to make more surveys. This is not necessary; remember the mosquitoes are biting and you are supposed to be a qualified director. You can make your surveys as you progress in your work.

So we need more equipment. We will need light traps to find out what species of mosquitoes are biting. From light trap collections you can tell what type of water mosquitoes are coming from. Now that you have found the breeding area, you will need equipment for water treatment. If you have only very small ponds you can use 1 or 2 gallon shoulder tanks. The most useful are the 44 gal. back packs which you can keep pumping as you spray. I am assuming that at this point the director has already contacted the state and his chemical supplier as to the type and amount of insecticides to be used in his applications. This is very important.

You may now find your larviciding areas are too large to do on foot and you will have to go into a swamp vehicle. A dune buggy or all-terrain vehicle is not the answer. You must go into a track type machine, heavy enough to bend small trees and light enough per square inch not to exceed the weight of an average man per square inch of foot weight. On this machine you can mount spray bars, tanks and a small pump that can be controlled by the machine operator. You may also install a separate hand gun for small pond spraying. On a bombardier you can also mount a backhoe.

Other equipment needed will be 30 or 50 gal. drums for carrying your larvicide. The best recommendation for this is to carry the water and oil separately and add the insecticide as you use it, otherwise some insecticides settle out and even lose shelf life. You will need a home base to house your equipment, a fuel oil tank for storage and a small laboratory with experimental tanks and a microscope, if you can afford this. You don't need a laboratory to kill mosquitoes, but it surely helps. Don't forget your boots because you can certainly get wet feet. You will need carrying bottles of all sizes, dippers and wide-mouth pipettes.

As far as the paper work is concerned, you may need an ordinance or other legislation depending on what state you are in. Permission forms, and location and record forms will be needed. Simplified record and location forms can be made so records can be kept by the applicator. An elaborate bookkeeping system is unnecessary.

The whole process of starting a program as described can be reversed if it can be started in the spring. It then would be necessary to concentrate on the larviciding program first. The main object of this article is to establish what is needed to get a program going.

Once your program is rolling, you will notice that conditions differ from one breeding area to another. You may ask, "why do we have breeding in this pond and not in that one?" Here is where a good field man comes in—and he doesn't have to be a chief, he could be an Indian. You take samples of plant and animal life from the area and run tank tests. One may find a certain type of algae