A LIST OF NINETEEN SPECIES OF ASILIDAE COLLECTED AT ROBSON, B. C. (Diptera)

HAROLD R. FOXLEE

Robson, B.C.

The species listed here, were identified for me by Dr. Stanley W. Bromley, and were all collected at Robson, B. C.

Laphria sackeni Wilcox
Laphria janus McAtee
Laphria gilva L.
Laphria vultur O. S.
Laphria crocea McAtee
Laphria sadales Walker
Laphria francisana Bigot
Asilus occidentalis Hine
Asilus auriannulatus Hine
Asilus callidus Williston
Lasiopogon monticola Melander
Stenopogon inquinatus Loew
Cyrtopogon montanus Loew
Cyrtopogon banksi Wilcox & Martin
Bombomina astur O. S.
Bombomina n. sp.
Pogonosoma ridingsi Cresson
Nicocles punctipennis Melander
Andrenosoma fulvicauda Say.

A NOTE ON THE USE OF MECHANICAL BAIT SPREADERS FOR GRASSHOPPER CONTROL IN BRITISH COLUMBIA*

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Fig. 2. Improved type of bait spreader made at Kamloops in 1940.—photo by I. Ward.

The rugged nature of British Columbia's rangeland presents many problems in grasshopper control not found in other parts of Canada. The largest areas subject to outbreaks consist of open rangeland, varying in elevation from 1,000 to 4,000 feet, travel over much of which is difficult.

It is interesting to note the changes that have been made in control measures during the past twenty years. At first, wagons were used to transport bait over the rangeland, and a large amount of equipment was needed to cover a relatively small acreage. Several mixing stations were necessary to serve the baiting

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wagons. To-day it has been found that modern trucks with super-low gearing can travel anywhere that wagons were able to go. There is now a tendency to use mixing machines to prepare the poisoned baits at central stations, from which the trucks operate. Marked advances have been made in developing more effective and cheaper poisoned baits. It may be said that the only part of control that has not changed in British Columbia is the method of spreading the poisoned bait. It is still scattered by hand, and in many respects this is at present the most difficult work in the entire control campaign.

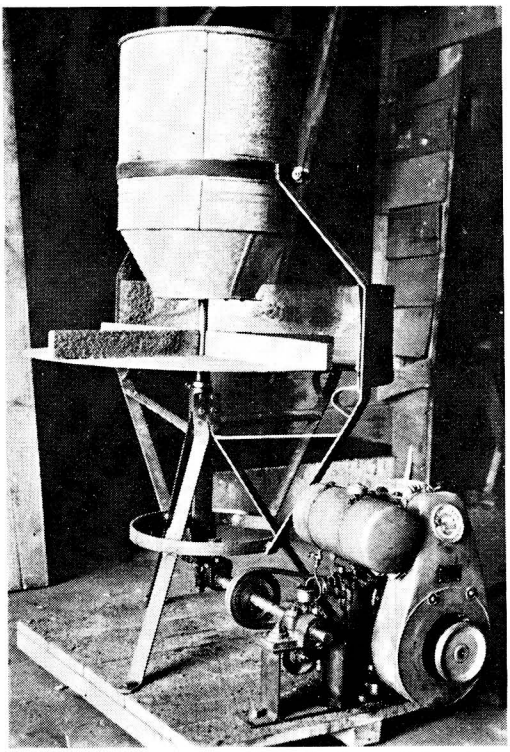

Fig. 1. Mechanical bait spreader constructed at Kamloops in 1938.—photo by I. Ward.

No one likes spreading bait by hand, and even when spread by a conscientious worker it is likely that more is used than is actually required. There is a limit to how thinly bait my be scattered by hand, and a careless worker not only wastes a lot but also creates a hazard to livestock. Bait materials are the most expensive items of any control program and this is where a substantial reduction in cost can be made.

The basic ideas for the construction of a bait spreader suitable for use in British Columbia wese obtained from plans of machines that have been used for several years in the Prairie Provinces of Canada, where conditions differ considerably from those in British Columbia. We will describe briefly the machines used on the plains, so that changes required tc meet B. C. conditions may be more readily understood.

Grasshopper Control and Mechanical Bait Spreaders In the Prairie Provinces :— On the prairies poisoned bait is generally mixed in large central stations, but the individual farmer is responsible for carrying out the control on his own property. Some farmers choose to spread the bait by hand, while others construct mechanical spreaders. Most units are made at a low cost by using discarded farm machinery and automobile parts. There are many types, but the operating principle of all is similar, and consists of a plate or spreader table revolving on a vertical shaft. Blades attached to this table catch bait dropped from a hopper above, and throw it by centrifugal force; a guard half way around the table prevents bait from being thrown

back into the vehicle. The action of the bait spreader is very similar to that of some of the small rotary hand seeders used for broadcasting grain. In most cases, power is supplied by (1) a take-off from a pulley or sprocket connected to the back wheel of the baiting vehicle, where the gearing ratio is arranged so that the spreader table revolves at a suitable speed in relation to the speed of the vehicle, or (2) a trailer-type drive in which the rear end assembly of a light car is pulled by the baiting vehicle. The drive shaft in the latter case is placed in a vertical position and the spreader table is connected to it. (For photographs see Farmers' Bulletin 54, Publication 606, Dominion Department of Agriculture). With both types of drive it can readily be seen that the speed of the revolving spreader table is dependent upon the speed at which the baiting vehicle travels. This is entirely satisfactory in the Prairie Provinces, where the land is flat and speed of travel can be fairly constant.

Grasshopper Control and Mechanical Bait Spreaders in B. C. :— In British Columbia, potential grasshopper areas are organized into Grasshopper Control Zones. Control measures are not carried out by the individual farmer. During years of heavy grasshopper infestation, men, trucks, and wagons are hired by an appointed committee to undertake baiting operations throughout the entire Zone area. Equipment and personnel often change from year to year. Under this system it would not be advisable to construct a bait spreader to fit any one vehicle; it should be of a type that could be used on any carrier. Due to the rugged nature of the country, the speed at which baiting vehicles travel is variable, and it would not be practical to use the "trailer-type drive" or "power take-off" as sources of power to operate the spreading unit.

In 1938 an experimental bait spreading unit was constructed at Kamloops (fig. 1). The design was very similar to those in use on the prairies, with the exception that a small air-cooled engine was used to drive the spreader table. Baiting tests were carried out in the Kamloops and Nicola Grasshopper Control Zones under actual range conditions, and the merits and demerits of this machine were observed. Although mechanical limitations made it impractical for general use, valuable information on baiting was gained. The bait was distributed thinly and evenly, and tests proved that at least 50 percent was saved as compared to the baiting-by-hand method. This marked saving warranted further efforts to overcome the mechanical shortcomings. These proved to be that (1) the unit was too high, making it difficult to fill the hopper with bait; (2) the bracing was inadequate for travel over rough terrain; (3) the unit was built without a clutch between the motor and driving mechanism and difficulty was experienced in starting the motor under load; and (4) the revolving speed of the agitator was too high. It can be seen in figure 1 that the shaft operating the spreader table continues into the hopper above and serves as the agitator shaft. It is essential that the spreader table revolve at high speed to break up and throw the wet bait, but it is mechanically unsound to have an agitator revolving at high speed through a wet mash, as the bait is thrown by centrifugal force to the wall of the hopper and does not feed properly through the outlet at the base.

In the spring of 1940 a new unit was built at Kamloops (fig. 2). This

machine was thirty inches in diameter and less than thirty-six inches high, resembling somewhat in dimensions a commercial washing machine. The improved features consisted in that (1) the unit was compact and sturdy enough to travel over rough terrain; (2) the hopper mouth was the full width of the unit, making it easy to fill with bait; (3) the agitator shaft revolved at one-tenth the speed of the spreader table; (4) a clutch was added to the unit to eliminate starting the motor under load; and (5) the unit was constructed so that bait could be thrown in any desired direction. The reduction of agitator speed was accomplished by using a hollow shaft to drive the spreader table; the agitator shaft operated inside of this shaft and was slowed down by means of a worm gear. All gears were enclosed in a gear box filled with oil. The control of direction in bait distribution was by a movable carriage supporting the hopper and guard. This carriage could be revolved quickly to any position making it possible to take advantage of wind direction while baiting. To bait along a roadside the machine could easily be set to throw bait to one side of the vehicle.

Baiting tests showed that the original mechanical shortcomings had been overcome. The improved machine was found to be a satisfactory type for operation under British Columbia range conditions. It was constructed for experimental purposes, however, and cannot be considered as a production model suitable for long periods of service. All gears and bearings were used-car parts. Changes in design were made during the construction of this machine and with the limited funds available it was necessary to overlook refinements of engineering. From plans of this unit two production models are now being built for use in British Columbia Control Zones. The use of proper gears and bearings in place of used car parts makes possible a far more compact gear box, which is cast instead of being made of welded sheet iron. All bracing is rolled angle iron in place of strap iron. The unit will be considerably more compact than the one illustrated in figure 2.

Advantages of Mechanical Bait Spreaders in British Columbia :— Experimental tests have shown that many advantages may be gained by using mechanical bait spreaders in this Province. These are (1) reduced cost of control by saving in bait materials and labor required; (2) more effective control due to a finer, more even distribution of bait; (3) quicker coverage of area of infestation than by baiting by hand; (4) greatly reduced danger of poisoning livestock; (5) more time for the operator of the machine to observe conditions than if busily engaged in throwing bait by hand; (6) possibility of extremely light scattering of bait, allowing areas of light grasshopper infestation to be baited, whereas by the hand spreading method the cost would be prohibitive; (7) allowing lighter equipment to be used to transport bait; and (8) the standardization of control in different Zones in the Province to make possible a more accurate check on results obtained.

Additional Note :— Two production models of the mechanical bait spreader were used in Grasshopper Control Zones in British Columbia during 1941. These units were more compact than illustrated in figure 2, being 30 inches in diameter and 30 inches high.

One slight addition was made to the original design. A circular plate of light metal, corresponding in size to the spreader table, was fastened to

the top of the fins. A hole 12 inches in diameter was cut from the centre of this plate to allow bait to feed to the lower disc of the spreader table. All bait thus travelled through a chute constructed of the two sheets of metal separated by the fins. This afforded a greater spreading range of bait as there was no "floating" of materials, due to wind resistance, encountered when a spreader table with exposed fins was used.

The two machines operated efficiently throughout the baiting season over the most rugged areas encountered in both the Nicola Valley and Clinton Grasshopper Control Zones. A fine, even distribution of bait was obtained and the saving in materials was considerably greater than first estimated from operations with experimental machines.

Acknowledgment

The basic ideas for the construction of a mechanical bait spreader for use in British Columbia were obtained from Publication 606, Farmers' Bulletin 54, published by the Dominion Department of Agriculture. I am indebted to Messrs. H. J. Kemp, S. H. Vigor, and K. M. King, the authors of this publication.

SOME FOOD PLANTS OF LEPIDOPTEROUS LARVAE. List No. 8

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Cobble Hill, B.C.

My thanks are again due to those members of this Society who have furnished information to be included in this List.

The following signs and abbreviations have been used:

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G.R.H. Mr. G. R. Hopping, Forest Insect Laboratory, Vernon, B. C.
W.G.M. Mr. W. G. Mathers, Forest Insect Laboratory, Vernon, B. C.
J. McK. Mr. J. McKinnon, Forest Branch, Victoria, B. C.
M.L.P. Dr. M. L. Prebble, Forest Insect Laboratory, Victoria, B. C.
R. G. Mr. R. Glendenning, Dominion Entomological Laboratory, Agassiz, B. C.
J. R. J. Mr. J. R. J. Llewellyn Jones, Cobble Hill, B. C.

An asterisk (*) denotes that the species has been mentioned before in these lists, and that the information now given is either additional or is an amplification of what has been previously reported.

Rhopalocera

**Basilarchia lorquini burrisonii* Mayn.—aspen (*Populus tremuloides* Michx.), black poplar (*Populus trichocarpa* T & G.), wild cherry (*Prunus emarginata* Dougl.), Oregon crab apple (*Pyrus rivularis* Dougl.), Siberian crab apple (ornamental. *Pyrus Siberica)* (J. R. J.)