

Mr. Bush—I quite agree that the crab-apple trees are bad and as they grow more or less in clumps, their destruction would not entail so much labor as one would think.

Mr. Wallace—How about the Government lands?

Mr. Cunningham—Let them also be attended to.

Mr. Chairman—I am sure we have to thank Mr. Cunningham for his excellent paper, and I trust he will favour us with another of equal practical importance another year. I wish now to draw your attention to the next paper on the programme, the commercial culture of the Narcissus. A recent importation in the form of the Narcissus Fly from Holland is causing much consternation to the growers of bulbs on Vancouver Island, and we are pleased to welcome Mr. Wallace here today as a practical grower of this class of stock. It has been the special endeavour on the part of our secretary to introduce the practical side into these meetings. I will now call on Mr. Wallace.

Mr. Wallace proceeded to give the members a short extempore account of the trouble the Narcissus Fly has been to him on Vancouver Island, dealing briefly with methods he had himself tried towards eradicating this insect. (His paper will appear at some later time.)

Mr. Chairman—Our secretary has been fortunate enough to obtain an account of the depredations of this Narcissus Fly by Mr. Priestly Norman of Victoria, a gentleman who has been in close touch with the commercial aspect of bulb-growing on the Island. I will now ask our secretary to read Mr. Norman's paper.

“MERODON EQUESTRIS” IN SOUTHERN BRITISH COLUMBIA.

“*Merodon Equestris*,” or Narcissus Fly, is an insect, resembling, roughly speaking, an ordinary bumble-bee, about the size of a large blue-bottle or blow-fly.

A still closer resemblance may be drawn to the horse-fly of the Upper Country, with which many are familiar. The similarity to the latter insect is so striking that the name “*Equestris*” was derived from it, this insect being much better known to the world generally, and having a far greater sphere of action than the Narcissus Fly, whose ravages are principally confined to the Narcissus alone.

In speaking of this insect, let it be understood that I make no assertions. I only give my observations and opinions. Having accepted as theories, several of the popular dogmas connected with this insect (which even at first hand are vague and unscientific), in the first place I was

gradually led to believe that in several vital ways the habits of the insect differed in British Columbia from its habits in Holland.

The perfect fly is seen from the end of March to the beginning of September, but practically all the harm done is in the month of May, as the hot sun, so essential to insect life, is during that month tempered by a dampness, which keeps the Narcissus leaves fresh and succulent.

Their activity is naturally greatest in the hottest part of the day, from 12 o'clock till about 2:30 or 3, and in badly affected areas their peculiar hum at such a time is sufficient to attract the attention of the uninitiated.

At this period the fly moves in the air with a spasmodic, lateral movement, is very restless when disturbed, and alights very lightly some distance off.

May being the month that the Narcissus Fly is most common and vigorous, this is the time it is seen in copula, when in this condition it seeks by preference a high growing object, such as a tree, bush or even a high growing weed. A hedge is a very favorite spot, and by going around the hedges or fences with a flat board or card it is possible to kill any quantity in such a position, as naturally they are slow on the wing when coupled, and disinclined to move very far.

The perfect fly is easily drowned, and, unlike nearly all other flies, positively helpless in the water (I have proved this by experiment), which is a point worth noting.

The breeding season seems more clearly defined than any other stage. This is probably due to the short life of the perfect insect.

I believe the insect lays its eggs in the centre of the crown of leaves by means of a long ovipositor, the grub in due time hatches out, and enters the bulb.

How it affects an entry is a disputed point, as although it would appear that the easiest way would be into the heart under the crown of leaves, there is no proof that this is so, and I have never found a trail that way.

The insect is poisonous to the narcissus, and sets up a rust (which is one of the ways to detect its presence), and there is never any mark in the top half of the bulb. Therefore, the only conclusion is that it must enter from the base and work upwards.

This seems difficult to understand, as one would think that the minute grub would have difficulty in making a passage through the earth to the base of the bulb.

The grub takes about six months to feed, from the time of its entry into the bulb, and then lies dormant till the turn of the year, or about February, when it vacates the bulb, and changes into pupa state, about

half an inch below the surface of the ground, and ultimately hatches out, as mentioned previously.

I will now mention the varieties of *Narcissus* most liable to attack by the fly, in order of percentage in each variety observed. The true *Narcissus* type is most susceptible, then come the intermediate season daffodils. (Commonest varieties mentioned).

Recurvus—most subject.

Barii conspicuus—nearly as bad.

Ornatus

Poetarum

Sir Watkin

Mrs. Langtry

Von Sion

Emperor

Early daffodils, like "Henry Irving," "Golden Spur" and "Princeps," are almost free, as are the late daffodils.

In the true white *Narcissi* the easiest way to detect the grub is to examine the root crown, and as these varieties rarely stop rooting, the year round, it makes it all the easier. If there is a portion where the roots have not sprouted and looks brown, it is almost sure to contain a grub. The usual way of squeezing the bulb to see if it is soft does not so readily apply in the case of daffodils, as the true white *Narcissi* are very hard bulbs. (Only a very small percentage of affected bulbs have any external puncture, except at base of bulb.) My reason for believing that an entrance is made there is that the progress of the grub upwards is registered on the root crown (this is only apparent in the continual rooting *Narcissi*, which, incidentally, is the class particularly attacked by the Fly), consequently as each bulb layer is bitten or pierced, a corresponding number of roots decay.

Although the base is thus affected, and in advanced stages the root growth ceases entirely before the dormant stage of the grub, a sporadic growth of the flower spike and leaf crown often continues, with the usual appearance (if strong enough to push through the earth) of a sickly yellow leaf, nearly always single. This is an infallible sign of the previous habitation of the grub in the month of February and March.

The next point is the appearance of the grub in the bulb. The grub seems to develop much more rapidly and healthily on damp spots (damp, I am persuaded, is essential), as in harvested bulbs out of the ground the grub is practically quiescent and torpid, starting to attack the bulb vigorously when planted in the ground.

The fact that the grub has had a check is noticeable in this way: if the grub is pure white and vigorous, it has received no check or shock;

if brown, leathery and sluggish, the bulb has been too dry for consumption. In this case the passage is filled with pulverized, effete matter, instead of the liquid slush which characterizes the perfect development of the grub.

As a proof of the irregularity of the grub stage, I have found minute grubs in bulbs alongside full-fed grubs in the next bulb.

I believe the pest was imported into British Columbia about six years ago, and was allowed to increase. As precedent was lacking in Holland (the labor there being very cheap and efficient), the pest was not dreaded. If they came across an affected area, they raised the bulbs and destroyed the grubs. This process is necessarily more difficult here, on account of the higher wages.

PRIESTLY NORMAN,
Victoria, B. C.

Mr. Wallace—I am inclined to differ from Mr. Norman in his persuasion that dampness is essential to the healthy growth of the grub. With the more susceptible varieties of bulbs attack is just as severe in dry, warm, sheltered positions.

Mr. Bush—In one instance at least I am virtually certain I have found the grub of this fly in a snowdrop.

Mr. Wilson—I am of the opinion that it will also attack the iris.

Mr. Treherne—I would like to draw the attention of the florists interested in this fly to the fact that there is a true bulb mite (*Rhizoglyphus hyacinthi* Boisd) which is capable of being the primary cause of injury to originally healthy bulbs. This mite has been taken in the East on importations of bulbs from France, Holland and Japan. I take pleasure in reading to you a short account of this mite as reported in the Journal of Economic Entomology, February, 1911. I merely mention this for fear of confusion in estimation of the injury due to the Narcissus Fly.

Through the courtesy of Dr. C. Gordon Hewitt, I am at liberty to read an account of the insect as reported in his annual report for 1911:

"Narcissus Fly (*Merodon Equestris* F)—During the past few years this insect has been noticeably present in British Columbia. It was recorded in 1908 by Prof. R. C. Osborn, having been caught by Mr. Harvey frequenting especially the flowers of the Salmon Berry (*Rubus spectabilis*). Professor Osborn believes that it properly belongs to our North American fauna, but I am unable to agree with him on account of its history in Canada and other countries. I am of the opinion that it has been introduced into Canada on imported bulbs, as I have found

the larva during the present year on bulbs imported into Ontario from Holland. It had been previously captured on Mount Royal, Montreal, by Mr. A. Chagnon in 1903. In British Columbia, it is now a serious pest of bulbs, and Mr. A. E. Wallace reported it as attacking narcissus and daffodil bulbs near Victoria, B. C., about 50,000 bulbs having been destroyed in the year. Mr. P. Norman has kindly furnished me with particulars as to many of its habits in that locality which was visited in October.

The perfect insect is seen from March to September, and appears to begin to breed in May. The eggs are probably deposited in the centre of the leaf crown. The larva are found in the centre of the bulb, having made their entrance through the base of the bulb. The bulbs are destroyed by the larva or maggots eating away the flattened stem at the base of the bulb and afterwards destroying the centre of the bulb. Professor Ritzema Bos, State Entomologist of Holland, who has written a complete account of this insect, records the eggs as being laid in the soil near the foliage. He informs me that it attacks chiefly *Narcissus tagetta* in Holland. Mr. Norman has observed that the early varieties of daffodils, 'Princeps,' 'Golden Spur' and 'Henry Irving,' are not attacked and that such varieties of narcissus as *N. poeticus ornatus* and *N. p. poetarum* suffer considerably. The method of eradication which has been found most simple and efficient in Europe is the annual lifting of the bulbs and the destruction of all those which are found to be attacked by the maggots, as can readily be seen. This method has been found effective in England, and also, Professor Ritzema informs me, in Holland. Soaking in water is of no value and the destruction of the pupae in the soil by the removal of the latter in the spring is impracticable in a large scale. Satisfactory results may possibly be obtained by poisoning the adult flies with sweetened arsenical baits, and experiments on this are being carried on in British Columbia."

INSECTS INFECTING IMPORTED NURSERY STOCK, FRUIT AND GRAIN, RECEIVED AT THE PROVINCIAL FUMIGATION AND INSPECTION STATION, VAN- COUVER, B. C.

Commencing with the Family Coccidae, of the order "Hemiptera," taking the Scale insects first:

"*Aspidiotus perniciosus*," or San Jose Scale, the genus and species of first economic importance, for which a large quantity of imported nursery stock has been condemned, those principally affected being de-