

codlin moth, which is a good solution if applied at the right time.

"Much has been said and written about spraying while the fruit is in bloom. I with others have given way to the persuasion that the egg of the moth was laid in the bloom, and that as the young fruit took shape the egg was hatched and ate its way into the fruit at the calyx; but experience and observation has taught me that I was mistaken. Professional men have urged the necessity of spraying while the fruit is in bloom, being deceived in the time the egg was laid. Prof. A. J. Cook, of California, says the codlin moth does not lay its eggs until the fruit has shed its blossom. I am glad to have so able a man corroborate my experience and observation. I have noticed for many years that the egg of the codlin was always found on the apple or pear until the first cold spell in the early fall, and never did I find an egg in the bloom. This aroused my thirst for facts in the case. Can it be possible for nature to provide an insect that will deposit a portion of its eggs on the petals of bloom and then continue through the summer to deposit eggs on the fruit? It has been found that by taking larvæ into a hothouse in cold weather and early spring and keeping the temperature up to about 60 degrees from the time the moths hatch out, they will lay their eggs, which would hatch, and the larvæ would bore into the fruit, mature, and eat their way out, spin their cocoons and hatch out as moths again in about six weeks; and by raising the temperature to about 70 degrees, the whole process could be accomplished in about five weeks. It has also been discovered that if the temperature were dropped far below 60 degrees the moth would not hatch out; and if hatched out with the the same low temperature the moths would not lay their eggs, and in about two weeks or so would die off. It has been demonstrated in open air: there being a warm spell in May, many moths were hatched out. This was followed by three weeks of low temperature, and the

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moths died off without laying their eggs, so there was no wormy fruit to speak of before July. Trees will blossom out at a considerably less temperature than 60 degrees. They are always in blossom before the moth hatches. This has been proven for years in Kittitas valley and other sections of Washington. The trees bloom and bear fruit, yet no codlin moth or larvæ can live even if imported, because the temperature is too low for them to exist. Now if any one doubts this, let him experiment for himself, and he will find that he may discover the eggs of the moth on the fruit, but not on the bloom.

"We have noticed the larvæ do not always bore into the fruit at the spot where the egg is laid. The egg is very small and hard to locate, but after finding it, if we mark the spot, we will also find that often the small larvæ will move some distance, and if it finds any object touching the fruit, such as a leaf or another apple, it will usually bore into the apple at that point; or if it strikes the calyx it will bore in there, as it is an easy place to get in. This makes some believe that the egg was laid in the bloom, when the egg in many instances was not laid for a month or six weeks after the tree was in bloom. Experience has taught me that spraying at the time the bloom is on, a man throws away his time and money, often drenching the trees to the extent that all the pollen is washed from the bloom and a crop of fruit lost to the owner.

"The time to spray for codlin moth is, in my opinion, immediately after the bloom falls. It may then be warm enough for the moth to lay her eggs, and if ever laid in the calyx, the spray will do more effectual work and the pollen is not washed from the bloom. Cold rains

often wash the pollen from the bloom, and a crop of fruit is lost, as was the prune crop in Clark county last year. It is my most sanguine belief that Kittitas valley is exempt from the attacks of codlin moth, owing to our low temperature. Great quantities of this insect pest have been shipped into this valley in fruit and shingles. I have lived here nearly fifteen years, and yet have to see the first wormy apple that I knew was raised in this valley. If any one present has seen a wormy apple he knows was raised in Kittitas valley, let us see your hand." (Not a hand went up). "Then have we not got the place for commercial orchards? Why do we not accept the situation?"

DISCUSSION.

Prof. Spillman: Mr. Maxey is correct, I believe, in the theory that altitude and climatic conditions are not favorable in this valley to the codlin moth. Investigation shows that, with but one notable exception, districts in the United States of a high altitude are free from the moth. That exception is the Salt Lake valley, and the fact that this pest flourishes there is accounted for by the fact that the basin is encircled by sheltering hills, which acts as a protection and modifying the temperature. As a boy I remember that before the advent of the codlin moth in Missouri, that state's apple production was very large and of the highest quality. After the moth appeared it was next to impossible to secure an apple without a worm in it. Apple growing became so unprofitable that orchards were practically abandoned and the supply of that fruit became so small that the home consumption could not be supplied. Later, by the application of systematic persistent methods the moth was

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