

size of a ten-cent piece, and the second immediately before the blossoms open, are the two sprays which destroy the greatest number of bud-moths.

The method of application, or to be more exact, the velocity of the spray when it touches the leaf, is the most important factor in the control of the bud-moth, the insecticide being secondary. In this connection it may be said that the spray gun is fully equal if not superior to the drive nozzle in the control of the bud-moth. One of the best points in regard to the spray gun is that the spray from it can be varied. Where bud-moths are numerous it can be so operated as to give a strong driving spray, and where bud-moths are not numerous, by standing a little farther from the tree and simply turning the wrist, a fine mist can be obtained that will control fungi and at the same time not result in spray injury and mechanical injury which sometimes follow control measures for bud-moths, green apple bug, etc. In the control of serious outbreaks of bud-moths, which usually occur in either thick or sheltered orchards, the most important point in control is to have the spray strike the leaf with sufficient velocity to drive the spray well into the cluster of leaves gathered together by the caterpillars, so that more of the spray will be found on the inside of the cluster than remains on the outside. Such procedure is only necessary and will only pay in serious infestations, as for instance where 30 per cent or more of the buds are infested. When less



Fig. 14.—Adults of (a) Eye-spotted bud-moth; (b) Oblique banded leaf-roller, and (c) Green bud-worm. (Original.)

than 30 per cent of the buds are infested the mechanical and spray injury, if lime sulphur is used as a carrier, will sometimes overbalance the benefits derived from the control of the bud-moths, and a spray more nearly approaching the ordinary mist spray should be used. In other words, the method of applying the two pre-blossom sprays should vary with the intensity of the infestation.

As is indicated in the discussion on table No. 7, and amply proven by experiments in the Annapolis Valley of Nova Scotia in 1915, 1916 and 1917, when lime sulphur is applied to the underside of apple leaves as invariably happens when it is forcibly applied with a drive nozzle or a spray gun, it will have a varying tendency to retard photosynthesis and cause the dropping of the fruit. This injury varies with the season and the period being most intense late in the season, particularly in seasons having less sunshine than normal. We have not as yet been able to attribute any retarding of photosynthesis to the use of Bordeaux, straight lead arsenate or sodium sulphide, (soluble sulphur and sulfocide) although some purely mechanical injury results from the use of apparently any solution at too high nozzle velocity for the spray immediately after the blossoms, and to a slightly less extent for the spray immediately before the blossoms. This slight mechanical injury to the blossoms or sets is inevitable in properly controlling bud-moths and will not cause nearly so much damage as a 30 or 40 per cent infestation of these insects.

Lime sulphur and arsenate of lime, 2 pounds to 100 gallons, may be used with safety for the first spray for bud-moth, but as a second spray, or that immediately before the blossoms, if applied in the manner recommended, causes some injury. For use after the blossoms, from 10 to 12 pounds of hydrated or water-slaked lime should be added to this combination.

Bordeaux mixture and its various modifications may be used with safety as a carrier for a number of poisons. It must be remembered, however, that while lime sulphur reduces the killing value of the poisons used with it by 19 per cent, Bordeaux