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INJURIOUS BEETLES OF THE GENUS DIABROTICA[1]

(COLEOPTERA: CHRYSOMELIDAE)

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INTRODUCTION: FOUR SPECIES AND TWO SUBSPECIES OF THE GENUS DIABROTICA ARE RECORDED AS SERIOUS PESTS OF CORN, CUCUMBERS, AND OTHER PLANTS. THESE ARE AS FOLLOWS: THE SPOTTED CUCUMBER BEETLE OR SOUTHERN CORN ROOTWORM, D. UNDECIMPUNCTATA HOWARDI BARBER, FIG.2; THE WESTERN SPOTTED CUCUMBER BEETLE, D. UNDECIMPUNCTATA UNDECIMPUNCTATA MANN.; THE NORTHERN CORN ROOTWORM, D. LONGICORNIS (SAY), FIG. 3; THE BANDED CUCUMBER BEETLE, D. BALTEATA LEC., FIG. 1; AND THE WESTERN CORN ROOTWORM, D. VIRGIFERA LEC.

ECONOMIC IMPORTANCE AND HABITS: THE LOSS TO CORN BY THE VARIOUS ROOTWORMS PROBABLY EQUALS THAT CAUSED BY THE EUROPEAN CORN BORER (BALL, 1957, P 126), THE MOST IMPORTANT SINGLE PEST OF CORN. THE SPECIES AND SUBSPECIES ATTACKING CUCUMBER AND OTHER CUCURBITS ARE AMONG THE MOST IMPORTANT PESTS OF THESE CROPS.

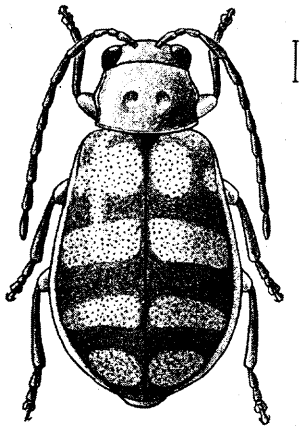

FIG. 1. BANDED CUCUMBER BEETLE.

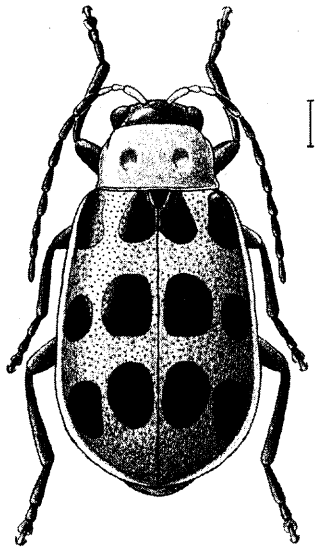

FIG. 2. SPOTTED CUCUMBER BEETLE.

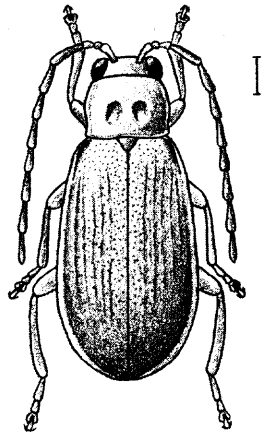

FIG. 3. NORTHERN CORN ROOTWORM.

(LINES EQUAL ACTUAL SIZE)

THE SPOTTED CUCUMBER BEETLE (KNOWN IN SOUTH-EASTERN U.S. AS THE SOUTHERN CORN ROOTWORM) IS THE MOST IMPORTANT PEST OF THIS GROUP. IT OCCURS THROUGHOUT THE UNITED STATES EAST OF THE ROCKY MOUNTAINS. THIS BEETLE IS A VERY GENERAL FEEDER AND IS RECORDED FROM OVER 200 COMMON CROPS, GRASSES, AND WEEDS. IT IS MOST INJURIOUS TO CORN AND CUCUMBERS BUT ALSO ATTACKS PEANUTS, LIMA BEANS, PEAS, AND MANY OTHER GARDEN PLANTS. THE LARVAE BURROW INTO ROOTS, CROWN, AND STEMS OF CORN, AND THE ROOTS OF CUCUMBER. THE INJURY IS ESPECIALLY SERIOUS TO YOUNG PLANTS. THE ADULTS FEED ON THE FOLIAGE AND FRUIT OF CUCUMBER AND THE FOLIAGE AND SILK OF CORN. IN THE SOUTHERN PART OF THE RANGE THERE ARE TWO GENERATIONS PER YEAR, IN THE NORTH THERE IS ONE; THE ADULT OVERWINTERS. DUE TO THE WIDE RANGE OF CROP PLANTS THIS INSECT FEEDS ON, THE TOTAL DAMAGE IT CAUSES PLACES IT AMONG OUR MOST INJURIOUS INSECT PESTS. IN ADDITION THIS BEETLE TRANSMITS THE CAUSATIVE AGENT OF CUCURBIT WILT AND BACTERIAL WILT OR STEWARTS DISEASE.

THE WESTERN SPOTTED CUCUMBER BEETLE (NEARLY IDENTICAL IN APPEARANCE AND SIMILAR IN HABITS TO THE SPOTTED CUCUMBER BEETLE) OCCASIONALLY CAUSES SERIOUS DAMAGE TO CORN, CROP PLANTS, GRASSES, AND ORCHARDS. IT HAS RECENTLY BEEN SHOWN TO TRANSMIT THE CAUSATIVE AGENT OF THE SQUASH MOSAIC VIRUS (FREITAG, 1956, P 73). THIS SUBSPECIES IS COMMON IN COLORADO, ARIZONA, CALIFORNIA, AND OREGON.

THE NORTHERN CORN ROOTWORM OCCURS THROUGHOUT THE UPPER MISSISSIPPI VALLEY AND IS ONE OF THE MOST SERIOUS OF CORN PESTS IN THE CORN BELT. THE ADULTS ARE GENERAL FEEDERS, BUT THE LARVAE FEED ALMOST

[1]CONTRIBUTION NO. 41, ENTOMOLOGY SECTION

EXCLUSIVELY ON THE ROOTS OF CORN; THEY WILL USUALLY DIE IF CORN IS NOT AVAILABLE. THE ADULTS FEED ON THE FOLIAGE AND CORN SILK OF GROWING PLANTS AND GREATLY REDUCE THE NUMBER OF KERNELS FORMED. THE EGGS OVERWINTER AND THERE IS BUT ONE GENERATION PER YEAR.

THE BANDED CUCUMBER BEETLE IS MOST IMPORTANT ON CUCUMBERS AND CORN BUT IS A GENERAL FEEDER AND IS FOUND ON A WIDE VARIETY OF HOST PLANTS. IT IS A SOUTHERN SPECIES AND OCCURS FROM FLORIDA TO TEXAS. SINCE 1958 IT HAS BECOME AN INCREASINGLY IMPORTANT PEST ON SWEET POTATO IN LOUISIANA. THE LARVAE FEED ON THE SURFACE OF THE ROOTS CAUSING LOSS IN MARKET VALUE OF THE POTATO. THERE ARE SIX OR SEVEN GENERATIONS PER YEAR IN LOUISIANA (PITRE AND KANTACK, 1962, P 904).

THE WESTERN CORN ROOTWORM WAS ORIGINALLY RECORDED AS A PEST IN COLORADO ABOUT 1909 BUT HAS SINCE SPREAD EASTWARD TO THE MISSISSIPPI RIVER. IT IS OCCASIONALLY SERIOUS AND WAS THE MOST IMPORTANT CORN PEST IN MANY CORN GROWING COUNTIES IN NORTHERN KANSAS IN 1953 (BURKHARDT, 1954, P 691). ITS LIFE HISTORY IS SIMILAR TO THAT OF THE NORTHERN CORN ROOTWORM. THE ADULT CAN BE DISTINGUISHED FROM THE OTHER SPECIES OF THIS GENUS IN THAT IT BEARS THREE LONGITUDINAL DARK STRIPES ON THE ELYTRA.

CONTROL: CULTURAL CONTROL METHODS ARE OFTEN EFFECTIVE FOR THE ROOTWORMS. ROTATION OF CROPS IS SUGGESTED FOR ALL SPECIES BUT IS MOST EFFECTIVE FOR THOSE WHICH ARE SPECIFIC TO CORN AND OVERWINTER IN THE EGG STAGE. DELAYING THE PLANTING DATE OFTEN REDUCES THE DAMAGE CAUSED BY THE FIRST GENERATION LARVAE OF THE SOUTHERN CORN ROOTWORM. PLOWING IN THE EARLY SPRING OR THE FALL AND FREQUENT CULTIVATION ARE RECOMMENDED TO REDUCE THE POPULATION OF MOST SPECIES.

SOIL INSECTICIDES ARE VERY EFFECTIVE IN CONTROLLING THE CORN ROOTWORMS. THESE CAN BE BROADCAST AND DISKED INTO THE SOIL, MIXED WITH FERTILIZER, OR MIXED WITH THE SEED. DUSTS, GRANULAR FORMATIONS, EMULSIONS, AND WETTABLE POWDERS MAY ALL BE USED. THE FOLLOWING INSECTICIDES ARE EFFECTIVE; THE DOSAGES ARE EXPRESSED IN POUNDS OF ACTUAL CHEMICAL PER ACRE: ALDRIN, HEPTACHLOR OR DIELDRIN AT 0.5 TO 2, CHLORDANE 1 TO 3, AND DDT AT 6. THE MATERIALS TO BE USED FOR TREATING CORN AND SMALL GRAIN SEEDS INCLUDE ALDRIN, HEPTACHLOR, DIELDRIN, OR LINDANE, 4 OZ., 25 PER CENT WETTABLE POWDER PER BUSHEL, OR CHLORDANE, 2 OZ., 50 PER CENT WETTABLE POWDER PER BUSHEL, APPLIED BEFORE PLANTING.

INSECTICIDES ARE ESSENTIAL FOR CONTROL OF THE CUCUMBER BEETLES. THESE CAN BE APPLIED AS DUSTS OR SPRAYS. DUSTS CONTAINING 1 PER CENT ROTENONE, 3 PER CENT DDT, 5 PER CENT MALATHION OR METHOXYCHLOR, OR 50 PER CENT CRYOLITE AT 25 TO 35 POUNDS PER ACRE ARE EFFECTIVE. SPRAYS CONTAINING 4 POUNDS OF DERRIS OR CUBE POWDER (4 PER CENT ROTENONE), 5 POUNDS OF CRYOLITE, 2 POUNDS OF 50 PER CENT PURIFIED DDT OR MALATHION WETTABLE POWDER, OR 4 POUNDS OF 50 PER CENT METHOXYCHLOR WETTABLE POWDER, ARE SUGGESTED.

ALL OF THE ABOVE RECOMMENDATIONS ARE FROM PEAIRS AND DAVIDSON, 1956, P 176-177, AND 324.

LITERATURE CITED:

BALL, H J. 1957. ON THE BIOLOGY AND EGG-LAYING HABITS OF THE WESTERN CORN ROOTWORM. JOUR. EC. ENT. 50(2):126-128.

BURKHARDT, C. C. 1954. CHEMICAL CONTROL OF THE WESTERN CORN ROOTWORM IN KANSAS IN 1953. JOUR. EC. ENT. 47(4):691-696.

FREITAG, J. H. 1956. BEETLE TRANSMISSION, HOST RANGE, AND PROPERTIES OF SQUASH MOSAIC VIRUS. PHYTOPATH. 46(2):73-81.

PEAIRS, L. M., AND R. H. DAVIDSON. 1956. INSECT PESTS OF FARM, GARDEN, AND ORCHARD. NEW YORK: J. WILEY AND SONS, INC. 661 P, 577 FIGS.

PITRE, H. N. JR., AND E. J. KANTACK. 1962. BIOLOGY OF THE BANDED CUCUMBER BEETLE, DIABROTICA BALTEATA, IN LOUISIANA. JOUR. EC. ENT. 55(6):904-906.