

LAUNCHING WORKSHOP-ICO –CFC-CABI PROJECT

INTEGRATED STEM BORER MANAGEMENT IN SMALL HOLDER FARMS-INDIA , MALAWI, ZIMBABWE

NATURAL ENEMIES OF COFFEE WHITE STEM BORER

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LAUNCHING WORKSHOP-ICO –CFC-CABI PROJECT

INTEGRATED STEM BORER MANAGEMENT IN SMALL HOLDER FARMS-INDIA , MALAWI, ZIMBABWE

MANY HYMENOPTERAN PARASITOIDS

SOME PATHOGENS AND

A FEW PREDATORS OF STEM BORER

HAVE BEEN RECORDED FROM INDIA,

VIETNAM AND THAILAND



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INTEGRATED STEM BORER MANAGEMENT IN SMALL HOLDER FARMS-INDIA , MALAWI, ZIMBABWE

HYMENOPTERAN PARASITOIDS RECORDED FROM VIETNAM

FAMILY : BETHYLIDAE

MYSEPYRIS GRANDICEPS

SCLERODERMUS DOMESTICUS

FAMILY: BRACONIDAE

DORYCTES BISTRIATUS

D. BREVIPETIOLUS

D. STRIOLIGER (SYN. *ALLORHOGAS PALLIDICEPS*)

D. PICTICEPS

PRISTODORYCTES STRIATIVENTRIS

PROMISCOLUS SESQUISTRIATUS

FAMILY: EURYTOMIDAE

EURYTOMA XYLOTRECHI

FAMILY: EVANIIDAE

PRISTAULACUS NIGRIPES VAR. *DUPORTI*

FAMILY: ICHNEUMONIDAE

PARAGLYPTA TIBIGERA



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STUDIES CONDUCTED IN CHO-GANH, INDOCHINA

DUPORT REARED *DORYCTES STRIOLIGER* (SYN. *ALLORHOGAS PALLIDICEPS*) IN THE LAB USING COFFEE AND BAMBOO BORERS (*CHOLOROPHORUS ANNULARIS*)

DURING 1920-24, 4 MILLION *D. STRIOLIGER* WERE REARED, AND RELEASED IN THE PLANTATIONS. BUT THERE WAS NO DECREASE IN THE BORER INFESTATION

AVAILABILITY OF THE STEM BORER LARVAE NEAR THE SURFACE IS NEEDED FOR PARASITISATION

POOR ESTABLISHMENT IN FIELD CONDITION



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STUDIES ON *SCLERODERMUS DOMESTICUS* IN VIETNAM

DURING 1914 TO 1919, DUPORT REARED *S. DOMESTICUS* USING COFFEE STEM BORER AND BAMBOO BORER *CHOLOROPHORUS ANNULARIS* AS HOSTS

THIS BETHYLID IS MORE ROBUST AND PROLIFIC

FEMALE APTEROUS , MALES UNCOMMON

FEMALES ENTER AND FOLLOW THE GALLERIES AND LAY EGGS ON LARVAE, PUPAE

LIFE CYCLE - TWO MONTHS

ADULT LONGEVITY- SEVERAL MONTHS

SEVERAL THOUSANDS WERE RELEASED WITH SOME SUCCESS



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PARASITOIDS RECORDED IN CEYLON AND THAILAND

CEYLON

FAMILY: ICHNEUMONIDAE

EPIXORIDES CAERULESCENS MORLEY

THAILAND

FAMILY: AULACIDAE

PRISTAULACUS SP

FAMILY: STEPHANIDAE

DIASTEPHANUS SP.



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STUDIES ON NATURAL ENEMIES IN NORTHERN THAILAND

THREE HYMENOPTEROUS PARASITIDS WERE RECORDED DURING 1994

PRISTAULACUS SP. (AULACIDAE)

DIASTEPHANUS SP (STEPHANIDAE)

A SPECIES OF MESOSTENINI (ICHNEUMONIDAE)

PRISTAULACUS SP.

BLACK, MEDIUM SIZED, POSSESS LONG OVIPOSITOR MORE OR LESS EQUAL TO THE BODY SIZE (11.2MM), SHORT LIVED (6-10 DAYS)

MAXIMUM EMERGENCE NOTICED DURING AUG-SEPT

RECORDED 18.1 – 35% PARASITISM

THE OTHER TWO SPECIES WERE VERY RARE



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PARASITOIDS RECORDED FROM INDIA

FAMILY: BRACONIDAE

ALLORHOGAS PALLIDICEPS (D. STRIOLIGER)

CAMPYLONERUS SP

DORYCTUS COMPACTUS

DORYCTUS COXALIS

EURYTOMA SP

IPHIAULAX SP

METAPELMA SP

FAMILY: GASTERUPTIDAE

GASTERUPTION SP

FAMILY: BETHYLIDAE

SCLERODERMA SP

SCLERODERMA VIGILANS

APENESIA SP

FAMILY: ENCYRTIDAE

AVETIANELLA SP. (EGG PARASITOID ?)



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STUDIES ON NATURAL ENEMIES IN INDIA

METAPELMA SP.

THE ADULTS WINGED, YELLOWISH

FEMALE WITH LONG OVIPOSITOR; MALES
SMALLER, SEX RATIO 1.8 TO 1.10

PARASITOID LOCATES THE STEM BORER GRUB
AND INSERT ITS OVIPOSITOR THROUGH THE
BARK; LAYS ABOUT 30-35 EGGS

COMPLETES LIFE CYCLE IN 32-35 DAYS

PER CENT PARASITIZATION WAS LESS THAN 4%
OBSERVED IN CCRI



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STUDIES ON NATURAL ENEMIES IN INDIA

ALLORHOGAS PALLIDICEPS (PERKINS)

RECORDED DURING 1986

IN ONE STUDY 79.16% GRUBS WERE PARASITISED(n=97)

IN ANOTHER STUDY PERCENT PARASITISATION RECORDED WAS 19.81 DURING WINTER FLIGHT PERIOD

EARLY AND LATER INSTAR GRUBS PARASITIZED

FECUNDITY - 27-32 PER FEMALE, LARVAL PERIOD 10-11 DAYS,
PUPAL PERIOD 11-13 DAYS

TOTAL LIFE CYCLE 25-30 DAYS

LONGEVITY - MALE 7-10 DAYS, FEMALE 34-40 DAYS

SEX RATIO 1:7



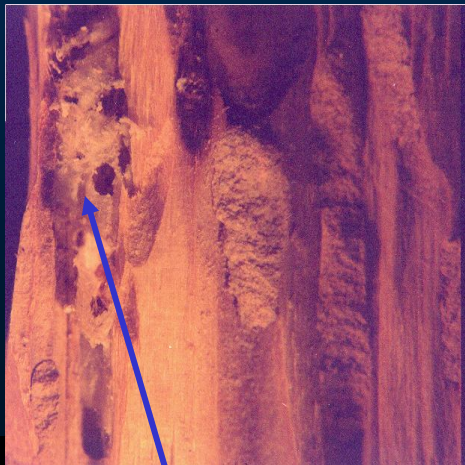
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INTEGRATED STEM BORER MANAGEMENT IN SMALL HOLDER FARMS-INDIA , MALAWI, ZIMBABWE

STUDIES ON NATURAL ENEMIES IN INDIA *ALLORHOGAS PALLIDICEPS* (PERKINS)



EXIT HOLE OF BORER



PUPAL CASE

ADULT



EXIT HOLE OF PARASITOID

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STUDIES ON NATURAL ENEMIES IN INDIA

IPHIAULAX SP.

LARVAL PARASITOID RECORDED DURING 1997

FREQUENTLY OBSERVED IN COFFEE PLANTATIONS

ADULTS GOLDEN YELLOW WITH POSTERIOR HALF OF BOTH WINGS DULL BLACK

FEMALE POSSESS LONG OVIPOSITOR



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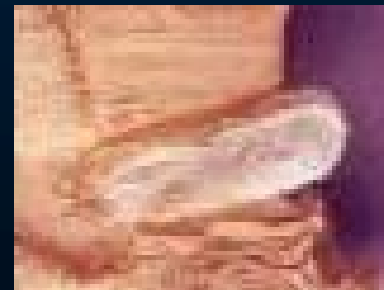
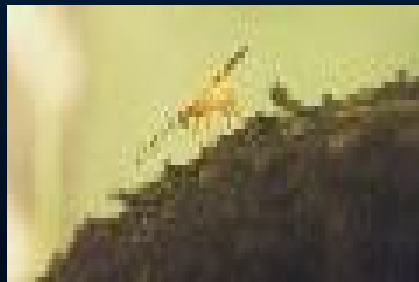
IPHIAULAX SP.

FEMALES (SINGLY OR IN GROUPS) FOUND HOVERING AROUND THE MAIN STEM AND THICK PRIMARIES OF STEM BORER INFESTED PLANTS, ESPECIALLY IN NEGLECTED FIELDS

THE DIAMETER OF EXIT HOLE 1.798 ± 0.23 MM

THE INFESTED STEM BORER LARVAE MORE LESS ON SUPERFICIAL, OR IN PUPAL CHAMBER.

ATTEMPTS TO REAR THIS PARASITOID IN THE LABORATORY WERE NOT SUCCESSFUL



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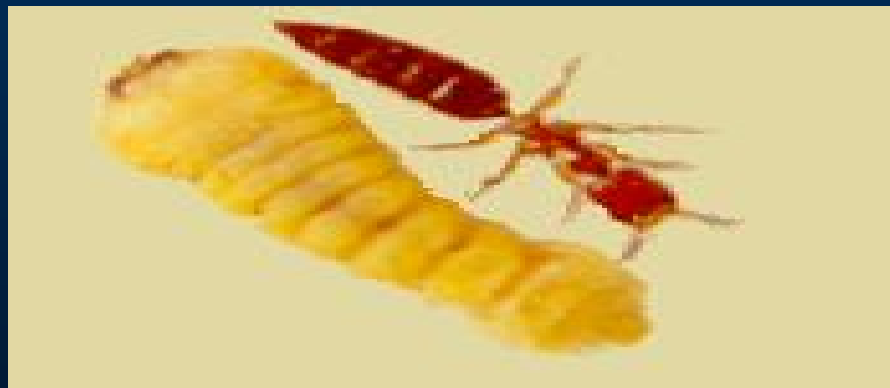
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STUDIES ON NATURAL ENEMIES IN INDIA

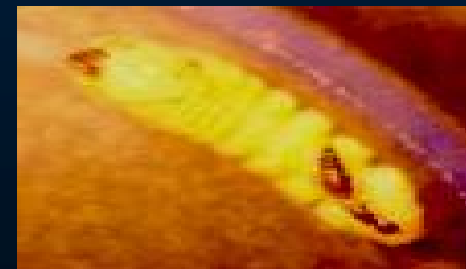
APENESIA SP.

RECORDED DURING 1992

STUDIES ON BIOLOGY, HOST SEARCHING
BEHAVIOUR AND FIELD AUGUMENTATION
INITIATED DURING 2001



ANOTHER BETHYLID,
RECORDED DURING 2002
(YET TO BE IDENTIFIED)
IS BEING STUDIED



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APENESIA SP.

ADULT

MALES WINGED, SHINY METALLIC BLACK IN COLOR WITH BODY SIZE OF 0.63 ± 0.14 CM LENGTH AND 0.13 ± 0.022 CM WIDTH

FEMALES WING LESS AND DARK BROWN IN COLOR MEASURING 0.65 ± 0.13 CM IN LENGTH AND 0.13 ± 0.025 CM IN WIDTH.

HEAD, THORAX AND LEGS YELLOWISH BROWN IN COLOR

ABDOMEN BROAD, DARK BROWN IN COLOR AND ALMOST THE SIZE OF THE HEAD AND THORAX TOGETHER

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APENESIA SP.

DETAILS OF BIOLOGY

PRE OVIPOSITION PERIOD	12.48 DAYS
OVIPOSITION PERIOD ON ONE GRUB	2.74 DAYS
AVERAGE LONGEVITY OF ADULTS – MALE	7.96 DAYS
FEMALE	66.48 DAYS
AVERAGE EGG LAYING /DAY/ ADULT	8.029 EGGS
AVERAGE EGG LAYING/ADULT/ HOST LARVA	17.52 EGGS
EGG LAYING CAPACITY /FEMALE	53.64 EGGS
AVERAGE NUMBER OF BATCHES OF EGG LAYING	3.33
AVERAGE DURATION OF MATING	20.66 MINUTES

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APENESIA SP.



ADULT MALE



ADULT FEMALE



EGGS ON BORER GRUB



LARVAE ON STEM BORER GRUB



APENESIA SP. – HYMENOPTERA: BETHYLIDAE



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APENESIA SP.

LABORATORY REARING AND FIELD RELEASES

MORE THAN 8000 PARASITIDS WERE MULTIPLIED ON STEM BORER GRUBS AND 4500 WERE RELEASED ON INFESTED PLANTS AT EIGHT SITES

IN LABORATORY TRIALS THE PARASITISM PER CENTAGE WAS 53

IN FIELD TRIALS THE PER CENT PARASITISM WAS 25



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PATHOGENS RECORDED ON WHITE STEM BORER

FUNGUS

BEAUVERIA BASSIANA- 2.5 % FIELD INFECTION REPORTED

B.BRONGNIARTII - RARE

ASPERGILLUS TAMARII – RARE

BACTERIA

SERRATIA MARCESCENCE – RARE

NEMATODES

STEINERNEMA GLASERI



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PATHOGENS RECORDED ON STEM BORER



ADULT INFECTED WITH *B.BASSIANA*



GRUB INFECTED WITH *B.BASSIANA*



GRUB INFECTED WITH BACTERIA



GRUB INFECTED WITH *ASPERGILLUS SP.*

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PREDATORY BIRD



BLUE BARBET *MEGALAIMA* SP.



BORER INFESTED STEM CHIPPED BY THE BIRD TO EXTRACT THE LARVA



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THANK YOU

