Anthonomus grandis **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Arthropoda	Insecta	Coleoptera	Curculionidae

Common name boll weevil (English)

Synonym *Anthonomus thurberiae* , (Pierce, 1913)

Similar species

Summary Anthonomus grandis is a brown to greyish-brown beetle native of Mexico to Central America and invasive in the United States. A. grandis feeds and develops only in cotton and closely related tropical (malvaceous) plants. In temperate zones *A. grandis* spends the winter in an adult reproductive dormancy where it subsists without food until it returns to cotton in the early spring. In subtropical and tropical areas adults are periodically active during warm periods of the non-cotton production seasons, and will feed and reproduce whenever suitable hosts are available. *A. grandis* has caused serious losses to the cotton industry in the United States. Recent eradication programs and management strategies have reduced *A. grandis* populations dramatically and have prompted a rebound in the cotton market within the United States.

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Species Description
The brown to greyish brown body of the beetle is covered with short, fine hair, giving it a fuzzy appearance. There is considerable variation in size from slightly more than 0.32cm to almost 1.27cm in length. *A. grandis*' snout is approximately half as long as its body. It is slightly curved and has chewing mouthparts on the end. Immature stages are found inside [cotton plant] squares [flower buds] and bolls. *A. grandis* eggs are seldom seen since they are deposited inside a square or boll. The larva is a small, legless grub with a brownish head and chewing mouthparts. This grub varies in size from very small to a half inch in length. The pupal or 'resting' stage of *A. grandis* is 0.95 to 1.27cm long and cream coloured with eyes and an obvious snout (Bohmfalk *et al.*1996).
Please see PaDIL (Pests and Diseases Image Library) Species Content Page *Beetles: Boll weevil* for high quality diagnostic and overview images.

Lifecycle Stages
Anthonomus grandis eggs hatch into the grub like larva in 2.5 to 5 days, they feed on the inside of the square or small boll. After larval development begins the infested square turns yellow, bracts open or flare and the fruiting form falls off the plant. The larva feeds for 7 to 14 days before pupating inside the square or small boll. During the next 4 to 6 days the pupal stage changes into an adult. The newly developed adult eats its way out of the square or small boll and feeds on other fruiting forms for about 5 days. During this time the weevil mates and females begin to lay eggs. The entire cycle takes 16 to 18 days under ideal conditions. Six or seven generations may be produced each year with each female having the capability of laying approximately 200 eggs (Bohmfalk *et al.*1996).

Habitat Description
In temperate zones *Anthonomus grandis* spends the winter in hibernation, called 'diapause', without food and returns to cotton in the early spring the following year. Over-wintering quarters usually consist of fence rows, broadleaved plant litter along creek bottoms, ditch banks and other protected, wooded areas near cotton fields. In the spring, over-wintered adults concentrate in early-planted fields nearest to over-wintering habitat where cotton is squaring (Bohmfalk *et al.*1996). In subtropical zones, over wintering adults may remain active through much of the non-cotton season. In extreme southern Texas, adults are rarely found in over wintering habitat typical of more temperate zones (Summy *et al.* 1993), and reproduction continues throughout the non-cotton season when regrowth or volunteer cotton plants are available (Summy *et al.*. 1988).

Reproduction
Reproduction in *Anthonomus grandis* is as follows; the beetles feed on cotton for 3 to 7 days and mate, they lay eggs in squares that have reached at least the \"one-third grown stage\" (approximately 0.64cm in diameter). Egg laying may occur in smaller squares; sometimes, sufficient feeding material is not available for a high percentage of larvae to develop to the adult stage. Late in the season eggs may be laid in small bolls, but squares are preferred (Bohmfalk *et al.* 1996).

Nutrition
Anthonomus grandis feeds and develops only in cotton and closely related tropical (malvaceous) plants. Adult weevils feed on tender cotton terminals in the spring, pollen in cotton squares (flower buds), and bolls (fruit).

General Impacts
Damage is caused by both adults and larvae. Although adult females prefer squares, they oviposit into both squares and young bolls and seal the holes with excrement. Egg punctures become small, nipple-like protuberances. Larvae (developing within the cavities) then feed within the squares, causing the bracts to open or \"flare,\" the colour to fade to a yellowish-green, and the plant to shed the infested squares. Limited feeding on the squares and bolls by adults usually does not result in shedding, but cotton fiber is sometimes ruined. Boll-rotting fungi may enter through egg and feeding punctures (NCIPM, 2003).

Management Info
NCIPM (2003) recommends controlling *Anthonomus grandis* using a combination of cultural and chemical methods.
\r\nPhysical: Recommended practices are (1) early planting, (2) stimulating rapid growth thorough preparation of the seedbed, by adequate fertilisation and by recommended weed control practices, and (3) selection of early maturing varieties specifically adapted to local areas. The main objective of these practices is to hasten the development of cotton plants and set a crop before weevils become abundant.
\r\nChemical: The application of a chemical defoliant toward the end of the season speeds up harvesting and allows crop residue to be destroyed as early as possible. As a result, potentially diapausing weevils are left without a food source. . . . Insecticidal controls include in-season and diapause applications. Regular in-season applications are used to control weevils during the major period of fruit set and boll maturity; these applications should be based on weekly weevil counts and damage. Initial insecticide applications are made when 10 percent of the squares are punctured. Insecticide applications are frequently used to reduce the diapausing (over wintering) weevil population. This practice delays the need for in-season insecticides the following year. When warranted, treatments should start at the onset of diapause and continue until fields no longer afford *A. grandis* food and breeding sites.

Pathway

Principal source: NCIPM (North Carolina Integrated Pest Management). 2003. Species: *Anthonomus grandis*\r\n Bohmfalk, G.T., R.E., Frisbie, W.L., Sterling, R.B., Metzer, and A.E., Knutson. 1996. Identification, Biology, and Sampling of Cotton Insects. The Texas A&M University System.

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Dale Spurgeon, USDA, Agricultural Research Service, College Station, Texas

Pubblication date: 2005-01-24

ALIEN RANGE

[1] ARGENTINA
[1] COLOMBIA
[16] UNITED STATES
[1] BRAZIL
[1] PARAGUAY
[1] VENEZUELA

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Managment information

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Summary: PaDIL (Pests and Diseases Image Library) is a Commonwealth Government initiative, developed and built by Museum Victoria s Online Publishing Team, with support provided by DAFF (Department of Agriculture, Fisheries and Forestry) and PHA (Plant Health Australia), a non-profit public company. Project partners also include Museum Victoria, the Western Australian Department of Agriculture and the Queensland University of Technology. The aim of the project is: 1) Production of high quality images showing primarily exotic targeted organisms of plant health concern to Australia. 2) Assist with plant health diagnostics in all areas, from initial to high level. 3) Capacity building for diagnostics in plant health, including linkage developments between training and research organisations. 4) Create and use educational tools for training undergraduates/postgraduates. 5) Engender public awareness about plant health concerns in Australia. PaDIL is available from : http://www.padil.gov.au/aboutOverview.aspx, this page is available from: http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=315 [Accessed 6 October 2006]

General information

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