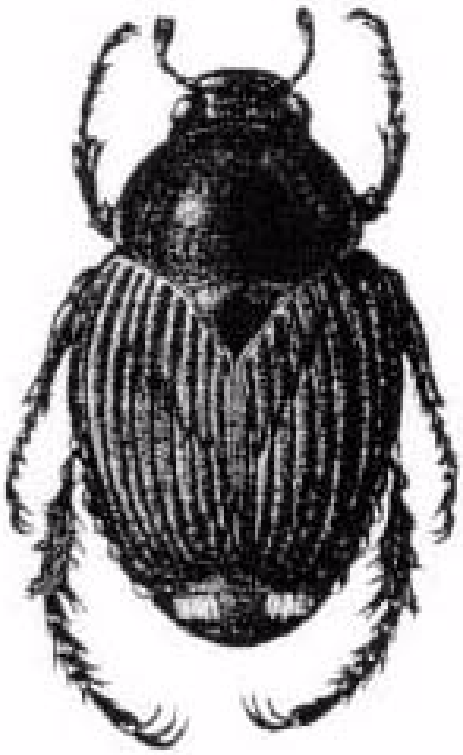
United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Japanese Beetle Program Manual



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Japanese Beetle Program Manual

Introduction

Japanese Beetle Program Manual for Airports

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Mission of APHIS

The Animal and Plant Health Inspection Service (APHIS) is an Agency within the United States Department of Agriculture (USDA). The mission of APHIS is to protect the animal and plant resources of the United States.

Mission of PPQ

Among other activities, Plant Protection and Quarantine (PPQ), a unit within APHIS, is responsible for preventing the spread of significant plant pests. Because of the extensive damage which it causes, the Japanese beetle (JB), *Popillia japonica* Newman, is a significant pest.

Japanese Beetle Policy

A primary objective of APHIS-PPQ is to protect the agriculture of the Western United States and prevent the artificial spread of the Japanese beetle from the Eastern United States. Artificial spread is the movement of an organism to a new area by other than natural means; in this case, artificial spread refers specifically to the movement of JBs on aircraft. This Japanese Beetle Program Manual will help APHIS-PPQ personnel and cooperators prevent the artificial spread of the JB.

Protected States

Nine Western States need to be protected from infestation by the Japanese beetle: Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Washington; therefore, these States are known as the Protected States.

JB Program Manual Tasks

Specifically, this manual will address the following tasks:

- Monitoring airports in JB-infested areas
- Determining the risk at JB-infested airports
- Issuing Emergency Action Notifications (EANs)
- Canceling Emergency Action Notifications
- Monitoring airports in JB-free areas
- Treating aircraft
- Treating grounds
- Using Compliance Agreements (CAs)

The *Japanese Beetle Program Manual* is to be used with other manuals and directives. As examples, the *Best Practices Guidelines* (May 15, 2003) gives additional information on management practices and the *U. S. Domestic Japanese Beetle Harmonization Plan* contains additional information on the movement of nursery stock. (For more information, see the section on “Related Documents.”)

Background

First Detection

The Japanese beetle (JB) was first found in the United States in 1916 near Riverton, New Jersey. In 1918, the USDA and New Jersey authorities attempted to exterminate this pest; however, the infestation was so well established that eradication by the control measures then in use and with the funds available was impossible.

Dispersal Information

By 1932, infestations were found as far west as St. Louis, Missouri and East St. Louis, Illinois.

By 1967, 19 States in the Eastern United States contained major or widespread infestations and four additional States had less extensive or more isolated infestations.

Transportation by aircraft threatens to introduce the JB to the Western United States.

U. S. Domestic Japanese Beetle Harmonization Plan

On August 19, 1998, the National Plant Board initiated use of the first version of the U.S. Domestic Japanese Beetle Harmonization Plan. This plan established procedures for the free movement of JB host commodities, such as nursery stock. A revision of this plan was put into use on March 14, 2004.

Additional Information

Information on the life cycle of the JB is in the Chapter ***General Information***, ***Life Cycle***, as well as information on the preferred hosts. Additional information on the non-preferred hosts and non-hosts is in **Appendix A**.

Scope

The chapters in this manual are as follows:

- Introduction
- General Information
- Management and Compliance Agreements (CAs)
- Airport Monitoring and Classification
- Control Measures

Introduction

The Introduction discusses the following topics:

- The purpose of the manual
- The historical background of the JB containment program
- The scope of the manual
- Intended users of the manual
- Related documents that could be used with the manual
- Information on updating the manual

General Information

General Information discusses the following topics:

- Economic importance
- Distribution
- Hosts and non-hosts
- Life cycle
- Descriptions of stages

Compliance Agreements (CAs)

Compliance Agreements discusses the following topics:

- Using the CA for monitoring airports
- Using the CA at regulated airports
- Operation under the CA
- Cancellation of the CA

Airport Monitoring and Classification

Airport Monitoring and Classification discusses the following topics:

- Overview—the need for airport monitoring
- Monitoring airports in JB-infested areas
- Determining the risk at JB-infested airports
- Using Emergency Action Notifications (EANs)
- Monitoring and managing airports in JB-free areas

Control Measures for Airports

Control Measures for Airports discusses the following topics:

- Overview
- Initiation of Control and Safety Procedures
- Treatments for Aircraft
- Treatments for Grounds

Appendixes

The Appendixes contain the following material:

Appendix A—Non-preferred Hosts and Non-hosts

Appendix B—Current Distribution of the Japanese Beetle

Appendix C—Current Maps Showing JB Distribution

Appendix D—Compliance Agreement

Appendix E—Trap and Lure Distributors

Appendix F—A Technique for Larval Surveys

Appendix G—PPQ Form 523 Emergency Action Notification (EAN)

Appendix H—Japanese Beetle Notification List

Appendix I—Insecticide Information and Distributors

Appendix J—Aircraft Information

Appendix K—PPQ Form 250 Aircraft Clearance or Safeguard Order

Appendix L—JB Aircraft Inspection Record

Appendix M—Airport Histories: Regulated and Deregulated Due to JB

Appendix N—Glossary

Users

The primary users of this manual may include the following:

- APHIS-PPQ line personnel
  - monitoring airports
  - cooperating under Compliance Agreements
  - supervising PPQ Officers
- State/County personnel
  - monitoring airports
  - cooperating under Compliance Agreements
- Airport personnel
  - monitoring airports
  - cooperating under Compliance Agreements
  - applying pesticides

Related Documents

The following documents may supplement this manual:

1. *Code of Federal Regulations: 7—Parts 300 to 309.* Published by the Office of the Federal Register (National Archives and Records Administration) at the United States Government Printing Office, this CFR (*Code of Federal Regulations*) guide contains information on the JB in Subpart 301.48.
2. Plant Protection Act. The Plant Protection Act of June 20, 2000, which modernized and streamlined the plant quarantine laws, replaced the previous laws. Information is in 7 USC 7701-36, with sections 14, 15, 23, 24, and 31addressing specific issues.
3. *U. S. Domestic Japanese Beetle Harmonization Plan.* The National Plant Board working with USDA-APHIS-PPQ and the American Nursery and Landscape Association developed the *U. S. Domestic Japanese Beetle Harmonization Plan*. Published by USDA-APHIS-PPQ, this plan establishes procedures for the free movement of JB host commodities. This plan is available at the following website:

   http://www.aphis.usda.gov/npb/jbintro.html
4. *Best Practices Guidelines for Japanese Beetle Management at Regulated Airports and Airport Monitoring in Protected States*. After development by interested parties (stakeholders), air carriers, and USDA-APHIS-PPQ, the *Best Practices Guidelines*

establishes procedures for excluding the Japanese beetle from aircraft. Each USDA-APHIS Plant Health Director has a copy; additional copies can be obtained from the office of the Plant Health Director.

5. *APHIS Agreements Management Manual.* Published by USDA-APHIS-PPQ, this manual establishes administrative policies and procedures for Cooperative Agreements (CAs) and other documents. USDA-APHIS-PPQ uses CAs to establish (1) goals and objectives, (2) funding levels and procedures, and (3) performance and/or services expected from cooperators.
6. *Collecting Environmental Monitoring Samples.* Published by USDA-APHIS-PPQ, this manual contains standard procedures for collecting, storing, and shipping environmental monitoring samples.
7. Directive 5640.1 - *Environmental Monitoring for APHIS Pest and Disease Control and Eradication Programs.* This directive discusses required environmental monitoring plans.
8. *Guidelines for Recording Environmental Monitoring Data on APHIS Form 2060 (Mar 92).* Available from the National Monitoring and Residue Analysis Laboratory, this document contains instructions on data entry for environmental samples.
9. *The United States Government Manual.* This manual is the official handbook of the Federal government and is available at the following website:

   http://www.gpoaccess.gov/gmanual/index.html
10. *Treatment Manual.* Published by USDA-APHIS-PPQ, this manual contains accepted treatments for various commodities including aircraft (T409).
11. *Characters Useful in Distinguishing Larvae of "Popillia japonica" and other Introduced Scarabaeidae from Native Species.* Published by the USDA in 1934 as Circular No. 334. This circular by Robert Sim contains descriptions and illustrations of the larvae of the JB, other introduced species, and native species.
12. *Federal and State Quarantine Summaries.* Published by the American Association of Nurserymen in cooperation with the National Plant Board and USDA-APHIS-PPQ, this reference contains a summary of the Federal JB quarantine; in addition, this reference contains State quarantine summaries which often mention the Japanese beetle.
13. *Aerial Application Manual.* Published by USDA-APHIS-PPQ, this is a guide for supervisors and other personnel who plan and conduct aerial application programs.

14. Insecticide Labels and Material Safety Data Sheets (MSDSs). All labels and MSDSs for insecticides effective against the JB are valuable sources of information on the handling and application of the effective insecticides.
15. *Quarantine Regulations of the Armed Forces*.
16. *Safety and Health Manual*. Published by USDA-APHIS-PPQ, this is a manual covering various safety and health-monitoring procedures.
17. *Managing the Japanese Beetle: A Homeowner's Handbook*. Program Aid No. 1599. Published by USDA-APHIS.

Updates

Updates to this manual (Transmittals) will be prepared and distributed as needed.

When the Transmittals are received, record the Transmittal Number and the date received in the Update Record in the front of this manual. Then remove the outdated pages and replace them with the current pages.

Questions on JB Program Manual

Refer any questions concerning the use or content of the Japanese Beetle Program Manual to the following office:

Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Domestic and Emergency Programs
4700 River Road, Unit 134
Riverdale, Maryland 20737-1236
(301) 734-8247
FAX: (301) 734-8584

2 General Information

Japanese Beetle Program Manual

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Economic Importance

The JB is a highly destructive plant pest causing both plant damage and increased control costs. For many years, extremely high populations have occurred sporadically. Feeding on grass roots, the grubs damage lawns, golf courses, and pastures. Attacking foliage, flowers, or fruits, the adults feed on more than 300 different ornamental and agricultural plants.

JB control by insecticides or biological methods is often expensive due to the labor, equipment, and/or insecticides involved.

State plant pest and regulatory officials in uninfested areas are concerned about the introduction of JB. To protect uninfested areas, cooperative Federal/State regulatory programs have been operating for about 50 years.

First Detection

The Japanese beetle (*Popillia japonica* Newman) was first found in the United States in 1916 near Riverton, New Jersey. In 1918, the USDA and New Jersey authorities attempted to exterminate this pest. However, because (1) the infestation was well established, (2) control measures then in use were marginally effective, and (3) funds were limited, eradication was impossible.

Since its introduction in 1916, the JB has spread throughout most of the United States east of the Mississippi. Because of the possibility of artificial spread by aircraft, the JB is a major threat to the agriculture and flora of the Western United States.

Distribution

Distribution in the United States

East of the Mississippi

At present, JB occurs throughout most of the United States east of the Mississippi River. For the current distribution, refer to the websites below.

West of the Mississippi

Many States west of the Mississippi River are non-infested; however, several States west of the Mississippi River are partially infested (Arkansas, Iowa, Kansas, Missouri, Nebraska, and Oklahoma).

Infestations in Protected States and non-infested States are eradicated.

Distribution at the County Level

Using counties, Appendix B is a current list of geographical localities infested by JB. The National Agricultural Pest Information System (NAPIS) also contains distribution information; the website is below.

The current map showing the distribution of JB should be placed in Appendix C. The current map is obtainable at either of the following websites:

http://www.ceris.purdue.edu/napis/pests/jb/imap/jbmap.html

http://www.ceris.purdue.edu/napis/pests/jb/imap/jball.html

Distribution in Canada

Areas regulated for Japanese beetle in Canada include (1) the southwestern portion of Quebec Province south of Montreal, (2) southeastern Ontario Province along the shores of the St. Lawrence, and southwestern Ontario Province in the area bounded by Lake Huron, Lake St. Clair, and Lake Erie. This last area includes the western shore of Lake Ontario. A complete listing of infested regional municipalities and a map are at the following website:

http://www.inspection.gc.ca/english/sci/surv/mrae.shtml

Distribution in Asia

A native of Asia, JB occurs in China, Japan, and Korea.

Hosts and Non-hosts

Host Range

Larvae feed on the roots and underground stems of plants, particularly grasses.

Adult JBs are gregarious general feeders on leaves, flowers, and fruits. Hosts include small fruits, tree fruits, truck and garden crops, ornamental shrubs, vines, and trees. Feeding studies show a host range in excess of 300 plants in 79 plant families.

Preferred Hosts

Preferred hosts are the following:

Abutilon hybridum	Chinese-lantern
Acacia baileyana	Cootamundra wattle
Aesculus hippocastanum	Horse chestnut
Acer palmatum	Japanese maple
Acer plantoides	Norway maple
Alcea rosea	Hollyhock
Althaea sp.	Althaea
Arbutus unedo	Strawberry tree
Bauhinia variegata	Orchid tree
Betula populifolia	Gray birch
Castanea dentata	American chestnut
Ceanothus griseus	Carmel ceanothus
Citrus sinensis	Orange
*Cydonia oblonga*s	Common quince

Eucalyptus sideroxylon	Red ironbark
Fremontodendron californicum	Common flannel bush
Glycine max	Soybean
Grewia caffra	Lavender starflower
Hibiscus syriacus	Rose-of-sharon
Juglans nigra	Black walnut
Lagerstroemia indica	Common crapemyrtle
Larix occidentalis	Western larch
Malus domestica	Apple
Nandina domestica	Heavenly bamboo
Parthenocissus quinquefolia	Virginia creeper
Platanus acerifolia	London planetree
Podocarpus macrophyllus	Yew pine
Polygonum spp.	Smartweed
Populus nigra	Italian poplar
Prunus spp.	Cherry
P. domestica	Plum
P. persica	Peach
Punica granatum	Flowering pomegranate
Quercus palustris	Pin oak
Rosa spp.	Rose
Rubus spp.	Raspberry
Sassafras albidum	Sassafras
Sorbus americana	American mountain-ash
Tilia spp.	Linden
Ulmus americana	American elm
U. procera	English elm
Vitis spp.	Grape
Zea mays	Maize
Zinnia elegans	Zinnia

The adults seriously injure corn by eating the silk which interferes with pollination and the formation of kernels.

Additional information on preferred hosts appears in the *Best Practices Guidelines*.

Non-preferred Hosts and Non-hosts

Although adult JB feeds on over 300 species of plants, it feeds sparingly or not at all on many cultivated plants. Some plants are rarely or never fed on; among these are the evergreens, common grains, most truck and field crops, and many of the common ornamental flowers.

The pear is the only common fruit that is not attacked.

When beetles are abundant, damage to plants may be avoided by using species that are immune or seldom attacked by the insect (Fleming, ARS Technical Bulletin No. 1545).

Appendix A lists plants that are either non-preferred hosts or non-hosts.

Life Cycle

There is usually one generation each year, but a percentage of the grubs may take 2 years to mature, especially in wet, cold soils. A diagram of a typical life cycle is on the following page. However, temperature and moisture affect the development of life stages. Therefore, in any locality the life stages will appear at varying times from year to year; in addition, the life stages will appear at varying times from north to south.

Egg Stage

The female JB burrows into the soil to a depth of about 3 inches to lay eggs. The eggs are deposited singly and only a few are laid at one time. Egg laying is intermittent and females usually deposit 40 to 60 eggs.

Larval Stage

The eggs hatch in about 2 weeks and the grubs begin to feed on grass and other roots. During the summer, the grubs feed within the upper 4 inches of soil in the turf; in late fall, they work downward in the soil as deep as 8 to 10 inches to spend the winter. In the spring, the grubs move upward and resume feeding on grass roots.

The full-grown larvae are about 1 inch long and usually lie in the soil in a curled position.

Pupal Stage

When full-grown, the grubs go slightly deeper in the soil and form an earthen cell in which to pupate. A pre-pupal stage is followed by a pupal stage that lasts 7 to 17 days. Therefore, the grubs enter the pupal stage about 2 weeks before adult emergence. Note that the pupal stage can last from 7 days to 20 days.

Adult Stage

Newly emerged adults may remain in the pupal cell for 2 to 14 days before emerging from the soil.

The adult JB is present during the warm summer months and lives above the ground.

In eastern North Carolina, the beetles begin to emerge from the soil in mid-May. In the vicinity of Philadelphia, the beetles begin to emerge about mid-June. In Tennessee, adult emergence begins in mid-June and continues until mid-August. Emergence is later in more northern locations, occurring in late June in southern New England and in early July in northern New England.

Peak adult activity occurs 4 to 6 weeks after first emergence.

In eastern North Carolina, most beetles are gone by mid-August, but in New England some may live until frost.

Beetles usually fly only in the daytime, and are especially active on warm, sunny, calm days. Often gregarious, the beetles feed mostly on the upper surfaces of leaves exposed to the sun. When feeding on the leaves, the beetles chew out the parts between the veins leaving only the veins. After this type of feeding, the leaves are described as being either “lace-like” or “skeletonized.”

A diagram of the life cycle is below in Figure 2-1

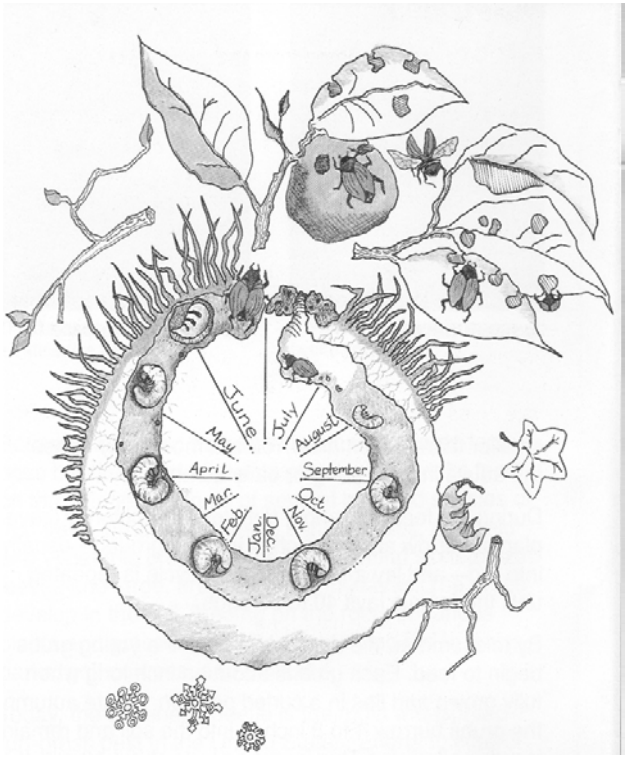

FIGURE 2-1: Diagram of the Life Cycle of the Japanese Beetle.

The Adult Life Stage

Description of Adults

Adult beetles are 10 to 12 millimeters (mm) long; their color is shiny metallic-green with coppery-brown elytra. The beetles can readily be recognized by the presence of six small patches of white along each side and the back of the abdomen, just under the edges of the elytra.

Sexing the Adults

A hand lens is helpful when sexing beetles in the field; with practice, sexing can be done with the unaided eye.

Adults can easily be sexed by the shape of the foretibia and tarsi. For males, the apical tibial spur terminates in a sharp point; for females, the apical tibial spur is elongated and more rounded. For males, the tarsus is shorter and stouter, with the first segment about as long as wide; for females, the tarsus is somewhat longer and more slender, with the first segment elongated and about equal in length to the next two or three segments combined. For males, the insertion of the tarsus is close to the apex of the tibia; for females, the insertion of the tarsus is closer to the mid-point of the tibia.

TABLE 2-1: Sexing the Adult Japanese Beetles

Males	Females
1. Foretarsus Shorter and stouter	1. Foretarsus Longer and more slender
2. Insertion of foretarsus Close to apex of tibia	2. Insertion of foretarsus Closer to mid-point of tibia
3. First tarsal segment About as long as wide	3. First tarsal segment 2 to 3 times as long as wide
4. Apical spur of foretibia Short and pointed	4. Apical spur of foretibia Elongated and rounded

The photograph on the next page is shown courtesy of Bruce Gill, Centre for Plant Quarantine Pests, Canadian Food Inspection Agency, Ottawa, Canada. This photo in Figure 2-2 illustrates the differences between male and female adults:

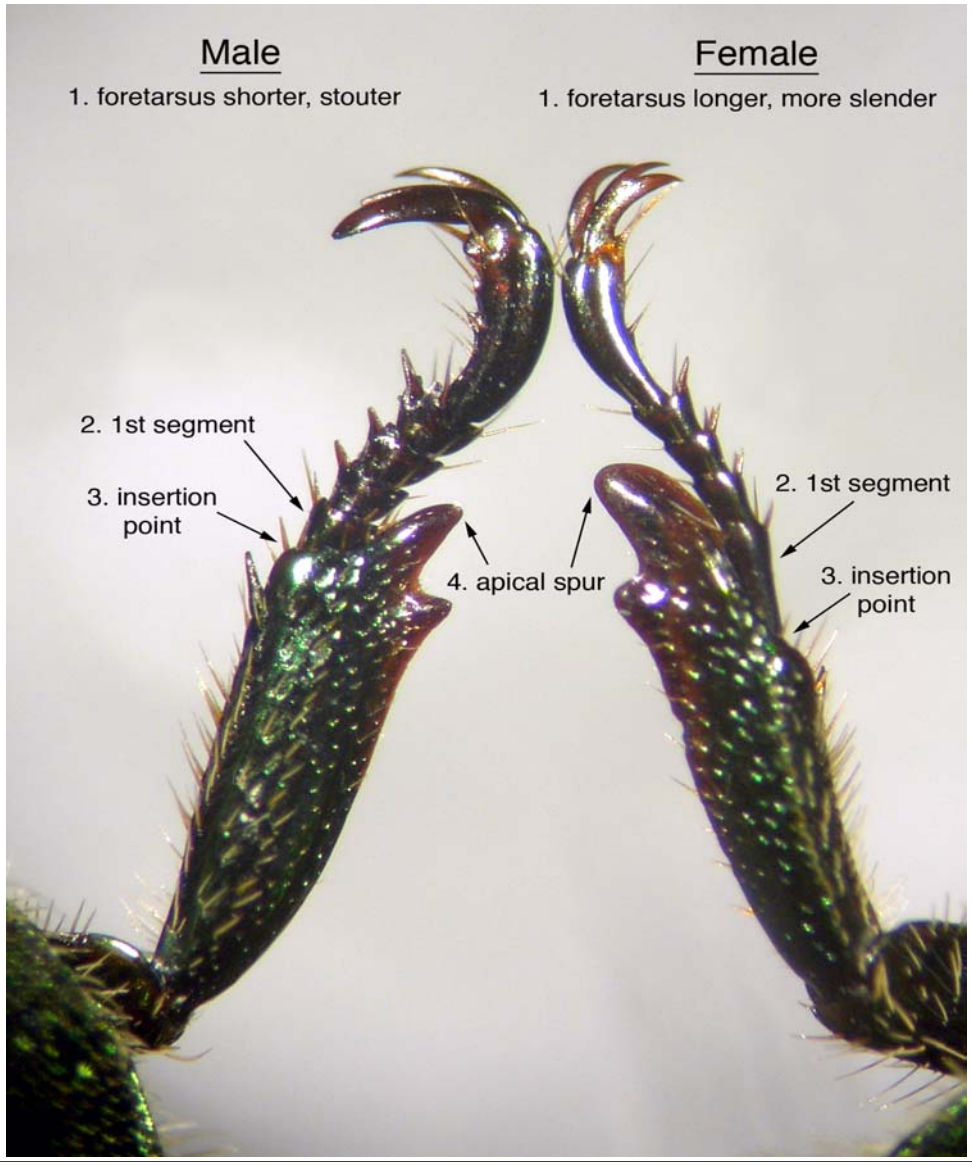

FIGURE 2-2: Photograph Showing the Foretibia of Males and Females with Distinctive Differences

The Larval Life Stage

Description of Larvae (First, Second, and Third Instars)

A micrometer eyepiece can be used to measure the length of the instar and the width of the head capsule; these measurements serve as an index for identifying the different larval stages.

TABLE 2-2: Size of Larval Instars

	First Instar	Second Instar	Third Instar
Length of instar	10.5 mm	18.5 mm	32 mm
Width of head	1.2 mm	1.9 mm	3.1 mm

Description of Larvae (Third Instars)

Length: 32 mm.

Form: C-shaped

Width of Head: 3 mm.

Surface of Head: Smooth, shining. Epicranial stem a fine, dark, impressed line. Epicranial arm not conspicuous. Front with a short, vague, longitudinal, median impression in apical third. At each side of this is a row of five punctures diverging toward the middle bend of epicranial arm.

Color of Head: Pale dull yellow.

Raster: Numerous coarse, rather long, scattered, brown, hooked spines. Medially, two conspicuous, divergent rows of shorter, straight spines in V form; 6 or 7 spines in each row. At sides and end of tenth segment, numerous rather long, yellowish hairs.

Anal Slit: Transverse, arcuate.

Vestiture: Entire grub with rather long scattered brown hairs. Dorsal convexities of first six abdominal segments clothed with fine, short, brown spines.

Habitat: Soil under turf.

The distinct V-like arrangement of short dark spines of the raster is sufficient to identify this species: Two rows of six or seven conspicuous, short, straight spines are arranged in a V-shape on the underside of the last body segment. **Figure 2-3** shows the V-like arrangement of the spines on the raster.

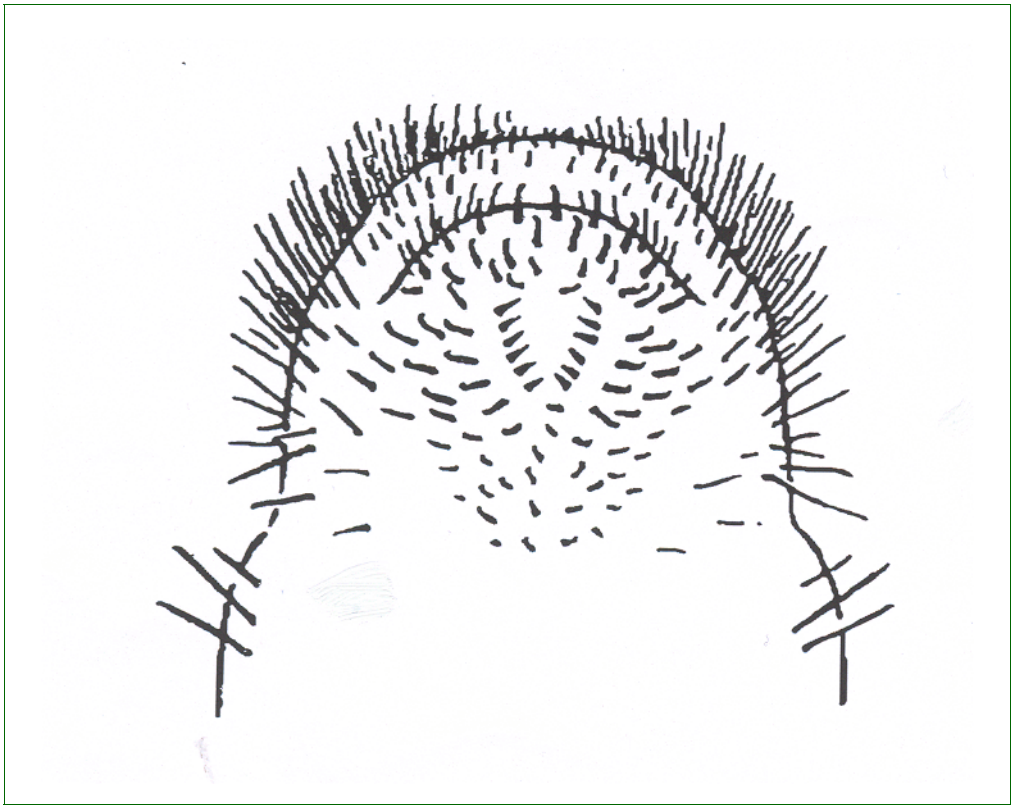

FIGURE 2-3: V-like Arrangement of Spines on the Raster

For further information on the identification of various white grubs found in turfgrass, use the extension factsheet found at the following website:

http://www.ag.ohio-state.edu/~ohioline/hyg-fact/2000/2510.html

3 Management and Compliance Agreements (CAs)

Japanese Beetle Program Manual

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Definition of Compliance Agreement

A Compliance Agreement (CA) is a written agreement between APHIS and an individual in a business engaged in growing, handling, or moving regulated articles. In a Compliance Agreement for the Japanese beetle, an individual will agree to comply with the provisions in the *Code of Federal Regulations* that deal with the Japanese beetle (7 CFR 301.48). Compliance with these provisions will reduce the risk of Japanese beetle introduction into the Protected States.

The Compliance Agreement can be used for many purposes. For example, if aircraft are likely to be JB-infested, they can be considered considered regulated articles. As regulated articles, aircraft likely to be infested are subject to regulation and, if needed, treatment. As another example, Compliance Agreements can be used to monitor the Japanese beetle status of airports receiving infested flights. These and other examples are discussed on the following pages.

Using the CA for Monitoring Receiving Airports

Airport monitoring at an airport receiving at-risk flights, possibly infested flights, will determine if a high-risk JB level exists at an airport or a portion of an airport. Under these circumstances, a CA is useful when establishing the goals and responsibilities of an airport monitoring program:

- Is the airport presently infested?
- How will the airport monitoring be done to determine if an infestation exists?
- When will the airport monitoring start?
- Who will do the work?

Using the CA for Monitoring Originating Airports

Airport monitoring at an airport from which at-risk flights originate will determine if a high-risk JB level exists at an airport or a portion of an airport. A CA is useful when establishing the goals and responsibilities of an airport monitoring program:

- Are infested flights leaving the airport?
- How will the airport monitoring be done?
- When will airport monitoring start and stop?
- Who will do the work?

See the chapter which follows on airport monitoring.

Using the CA at a Regulated Airports

When a high-risk JB population exists at an airport or a portion of an airport, a CA is useful to establish the goals and responsibilities at the regulated airport:

- How will aircraft be handled and/or treated?
- Will the grounds need treatment?
- If the grounds need treatment, how will the grounds be treated? When will treatments start?
- Who will do the work?

Appendix D contains additional information on the CA. Also see the chapter Control Measures

Operating Under a CA

Authorized Inspectors

Authorized Inspectors can be (1) any employee of APHIS or (2) any individual authorized by APHIS to enforce the JB quarantine.

Access for Authorized Inspectors

Any individual who enters into a CA (and employees or agents of that person) must allow Authorized Inspectors access to all areas where regulated material are handled. Along with other areas, these areas include the following:

- Aircraft-operating areas at regulated airports where loading, unloading, servicing, and/or treatment of aircraft occur
- Aircraft-operating areas at airports in JB-free areas where unloading and servicing (and possibly treatment) occur
- Secured areas of airports

To allow the Authorized Inspectors to have access to secured areas, procedures must be put in place as soon as possible when needed.

NOTICE

Because gaining access to secured areas may take some time, preparation to obtain needed clearance should start as soon as possible; in fact, the State Plant Health Director (SPHD) should obtain clearance for potential inspectors before the need arises.

Record Keeping and the CA

Any individual who enters into a CA (and employees or agents of that person) must allow Authorized Inspectors access to all records regarding treatment.

Applicators treating aircraft or supervising aircraft treatments must keep their records for 2 years. If Authorized Inspectors request records for review, the records must be presented.

NOTICE

If a CA is not in place (because of a refusal to sign or any other cause), an Emergency Action Notice will be used, when needed, for regulatory purposes.

Legal Recourse for Non-compliance

Title IV of the Agriculture Risk Protection Act of 2000 is better known by its short title, the Plant Protection Act (PPA). Among its many authorizations, the Plant Protection Act provides the authority to prohibit the interstate movement of plant pests (Section 411, Section 412). Also, the Plant Protection Act provides the authority to increase the civil penalty to a maximum of $250,000 per violation for businesses (Section 424); in a single adjudication, there is a $500,000 cap for civil penalties (Section 424).

Canceling a CA

If Authorized Inspectors determine that compliance was not satisfactory, they may cancel CAs. The cancellation may be written or oral. If the cancellation is oral, within 20 days of cancellation the Authorized Inspector will write a letter that (1) confirms the oral cancellation and (2) states the reasons for the cancellation.

Appeal of Cancellation

Within 10 days after receiving written notification of a cancellation, any person whose CA has been canceled may appeal the decision by writing to the APHIS Administrator. The appeal must state all facts and reasons that would show that the CA was wrongfully canceled. The APHIS Administrator will adopt rules of practice for a hearing that will resolve the conflict.

As promptly as circumstances allow, an appeal will be granted or denied in writing. The reasons for the decision will be stated.

If canceled, the CA will remain canceled pending decision of the appeal.

4

Japanese Beetle Program Manual

Airport Monitoring and Classification

Overview

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Overview

Goal of Airport Monitoring

The goal of airport monitoring is to assess the three major factors that will indicate the level of risk, the likelihood that JBs will enter aircraft:

- The level of the JB population
- The amount of JB activity near aircraft-operating areas
- The risk of JB entry into aircraft and transport to JB-free areas

Remember that aircraft-operating areas include passenger-boarding, luggage-handling, and/or cargo-loading areas.

The information gathered when monitoring will allow the subsequent classification of the entire airport or a part of the airport.

Goal of Airport Classification

The goal of airport classification is to classify airports in the JB-infested area into either a regulated or non-regulated status. This classification into regulated and non-regulated airports is based on the threat that the airports pose to the JB-free areas. In the JB-free area, nine Western States need to be protected: Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Washington.

Regulated airports in the JB-infested areas under quarantine should be those airports where the JB is likely to enter aircraft and be transported to JB-free areas. APHIS will issue an Emergency Action Notification (EAN) to inform airport personnel when the airport is to be regulated. APHIS inspectors can cancel an EAN to return a regulated airport to non-regulated status.

Non-regulated airports in the JB-infested areas under quarantine should be those airports where the JB is **not** likely to enter aircraft and be transported to JB-free areas.

Airport Monitoring and Classification

Monitoring Airports in JB-infested Areas

The State Plant Health Director (SPHD), an APHIS employee, is responsible for arranging a monitoring survey to determine the risk status of an airport. A minimal level of monitoring requires visual surveys of aircraft-operating areas in airports that were regulated in any of the last 3 years.

In JB-infested areas, Authorized Inspectors (either PPQ officers or inspectors authorized by APHIS-PPQ) will survey under the direction of the SPHD to determine the potential risk at each airport. Monitoring surveys will determine the JB population level and the threat of entry into aircraft.

Monitoring will use one or more of the following methods:

- Trapping adult beetles
- Larval Surveys for the grubs
- Adult Visual Surveys at aircraft-operating areas

Trapping Adult Beetles

Trapping adults is a valuable monitoring method which gives a population estimate at the time when transport is most likely. Within a single season, trapping adults will determine when adult emergence begins, peaks, and ends. Over several seasons, trapping adults will detect population trends within the airport.

Number of Traps

For infested airports that have flights to JB-free areas, a trapping rate of 4 to 8 traps per airport is recommended.

Trap Types

Dual-lure traps, containing both food and pheromone lures, are most effective in attracting adults. Commercial dual-lures are available and should be used.

If only a food-type lure is used, it should be PEG which is a combination of phenyl ethyl propionate, eugenol, and geraniol in a ratio of 3:7:3. Use of the food-type lure alone is not recommended.

Commercially prepared, sustained-release dispensers are available to disperse the pheromone lure for 75 to 100 days. Neither trap color nor size is a factor in trapping JB adults. JB traps are usually yellow; however, white and green traps are equally effective.

Trap Placement

Trap placement is critical. Place traps to meet the following criteria:

- All-day sun (or at least mid-day sun). Traps placed in direct sunlight are twice as effective as those placed in the shade.
- Close proximity to host plants (but not immediate proximity). Trap placement should be 3 to 7 yards from favored trees, shrubs, and vines. Do not place traps immediately adjacent to tall, bushy plants or other objects which could interfere with dissemination of the lure.
- Placement at 22 inches above ground level. Traps baited with a pheromone attractant and PEG were most effective at 22 inches above ground level.

NOTICE

When placing traps, *never* put traps near aircraft-operating areas. Above all, *never* put traps *only* near aircraft-operating areas. Traps near aircraft-operating areas will only attract beetles into the aircraft-operating areas, creating entry problems where none existed.

Trap Examination

Examine traps periodically to ascertain that traps are completely operative. Remove contents of receptacles and clean the trap. Discard all insects other than the JB; save JB suspects for identification. Never reuse traps without inspecting for the presence of dead or live beetles.

NOTICE

If the airport is in a State involved in invasive species surveys, consider examining the traps for non-target exotic species. If an airport receives flights from around the world, an additional examination for exotic species may be a valuable part of an exotic species detection program.

At the end of the monitoring (or control) season, traps should be stored in a dry location. They may be stored either assembled or disassembled. Traps should be thoroughly cleaned for storage.

Appendix E contains information on trap and lure distributors.

Trap Removal

When a high-risk situation exists at an airport (JBs are likely to enter aircraft in an aircraft-operating area), traps should be removed following the first detection.

When a low-risk situation exists at an airport (JBs are **not** likely to enter aircraft in an aircraft-operating area), traps can remain in place throughout the monitoring period.

Larval Surveys

Because of the time and effort required, larval surveys are usually done (1) when a high-level population is likely and an insecticide treatment may be necessary and/or (2) when traps for monitoring adults are not placed. Larval surveys are most often done to determine the most common life stage and the population level when traps for monitoring adults are not placed.

If turf damage indicates a large number of grubs in the soil, a larval survey should be done. During the spring and fall, grubs damage turf leaving the surface soft and spongy as the fibrous roots are consumed. Severely damaged turf, even though still green, can usually be rolled back like a rug. Other scarabaeid grubs produce damage similar to the damage caused by JB; therefore, identification of the damaging grubs is necessary.

Appendix F contains a larval survey method for economic populations.

Adult Visual Surveys

Adult visual surveys are commonly used to determine the level of the JB population in aircraft-operating areas. A minimal level of monitoring requires visual surveys of aircraft-operating areas in airports that were regulated in any of the last 3 years.

To coordinate visual surveys with the most threatening periods, use traps to detect the start of emergence and the peak emergence period. As an alternative, use surveys of various preferred hosts.

Peak Emergence Period

Adult beetles begin to emerge in May in southern localities, later in northern localities. Peak adult activity occurs 4 to 6 weeks after emergence starts.

Frequency of the Visual Surveys

During the Peak Emergence Period, perform visual surveys three times per week.

Duration of the Visual Survey

Each visual survey at an aircraft-operating area should last at least 15 minutes and should be conducted under conditions favorable for JB activity.

Time, Humidity, and Temperature

Adults fly only in the daytime. Critical times to observe JB associated with aircraft would be during daylight hours on warm, sunny, and calm days when beetles are active. When air temperatures reach the peak for the day, usually between 1 pm and 2 pm, peak captures occur.

Trapping has showed that 45 percent of beetle activity occurs between 10 am and 1 pm. Although captures were spread out over most of the afternoon, peak captures occurred between 1pm and 2 pm, when air temperatures were at their peak for the day. Fewer than 5 percent of the beetles were captured after 5 pm or before 9 am.

Beetles fly on clear days when the temperature reaches about 70° F and relative humidity is below 60 percent. Often, but not always, temperatures above 95°F or relative humidity above 60 percent stop or reduce flights of the adults. (In Louisville, KY, flights did occur when the temperature was near 100°F and the relative humidity was 70 percent.) When Japonilure was used alone, about 70 percent of the captures occurred between 10 am and 1 pm and captures peaked about noon.

Rain and the Visual Survey

Adult emergence is especially heavy the day following a rainstorm. If possible, conduct visual surveys on the days following a rainstorm.

Detections on Aircraft

Airport monitoring using traps, larval surveys, and/or visual surveys may not detect a high-risk situation. A single interception at an airport in a JB-free area is an indication of a potentially high-risk situation at the originating airport. Therefore, when Japanese beetles are found on aircraft in the JB-infested area and those aircraft are scheduled to go to JB-free areas, a high-risk situation probably exists.

Reporting Monitoring Information

Instead of weekly reports during the monitoring period, information will be (1) entered into the "Japanese Beetle Survey Program" database, (2) entered into the "Japanese Beetle Interception Database, and/or (3) presented during the National Weekly Japanese Beetle Conference Call.

NOTICE

If monitoring data is to be useful, it must be accurate and timely; ideally, entry within 24 hours after collection is desirable.

Reports from JB-infested Areas

Information from JB-infested States will be entered into the "Japanese Beetle Survey Program" database.

When monitoring information indicates a threatening condition, weekly reports are necessary. Even if a threatening condition is not present, weekly reports are desirable for the exchange of information on emergence and population levels.

NOTICE

The first find of a Japanese beetle infestation in a county or State, a New County Record or a New State Record, must be entered into the National Agricultural Pest Information System (NAPIS).

"Japanese Beetle Survey Program" Database

Use the following procedure to assess the "Japanese Beetle Survey Program" database:

1. Enter Lotus Notes.
2. Click on database icon (usually on left side of screen). When the cursor is on the icon, the cursor tag will read "Databases."
3. Select "Browse for a Database."
4. At the "Server:" window, select "Data02/INT/APHIS/USDA."
5. Scroll down and select "Japanese Beetle Survey."

Reports from JB-free Areas

Searching the "Japanese Beetle Interception" database will provide information on interceptions of Japanese beetles on aircraft arriving in the JB-free area. All interceptions will be reported, regardless of whether the Japanese beetles are alive, moribund, or dead.

The "Japanese Beetle Interception" database is accessible only to APHIS personnel and others having Lotus Notes access; however, the information can be shared will all cooperators in the Japanese Beetle Program. Typical of the cooperators in the Japanese Beetle Program are air carrier personnel, airport personnel, SPROs, and others.

"Japanese Beetle Interception" Database

Use the following procedure to assess the "Japanese Beetle Interception" database:

1. Enter Lotus Notes.
2. Click on database icon (usually on left side of screen). When the cursor is on the icon, the cursor tag will read "Databases.
3. Select "Browse for a Database."
4. At the "Server:" window, select "Dev01/INT/APHIS/USDA."
5. Scroll down and select "Japanese Beetle Interceptions."

Reports at the End of the Season

After traps are removed for the season, information on New State Records (NSRs) and New County Records (NCRs) will be entered into the National Agriculture Pest Information System (NAPIS).

Airport Monitoring and Classification

Determining the Risk at JB-infested Airports

NOTICE

Refer to this Section for general guidelines. Refer to the Code of Federal Regulations Section 301.48-2 (a) for legal language.

Steps for Evaluating a JB-infested Airport

To determine the risk situation at a JB-infested airport, use the following steps.

Step 1: Determine if the airport is at risk.

Use the following risk criteria to determine if the airport is at risk:

JB Population Level: Consider the first criterion: Is the JB population at a high-risk level? Another way of stating this criterion is: Is the JB population high enough to place aircraft or cargo at high risk? Aircraft at high risk, referred to as high-risk aircraft, are those aircraft scheduled to fly to JB-free areas and either exposed to infestation by JB or carrying cargo expose to infestation.

The detection of JBs at an origin airport or in the immediate vicinity is not in itself sufficient reason for declaring the airport under quarantine, that is treated as a high-risk regulated airport. Beetles must be closely associated with aircraft that are loading, unloading, or parking during critical times; in addition, the beetles must present a danger of gaining entry to the interior of aircraft, either by direct flight or by hitchhiking on passengers' clothing or cargo.

Aircraft-operating Areas: Consider the second criterion: Are aircraft in aircraft-operating areas or cargo likely to become infested?

Generally, high-level JB populations alone are not sufficient to cause an airport (or part of an airport) to be regulated. A high-level population may be isolated from the aircraft-operating area. However, a high-level population with high probability of aircraft or cargo infestation will necessitate airport regulation.

When medium or high adult populations are present at or adjacent to aircraft-operating areas, a high-risk situation is usually readily apparent. Light populations may be more difficult to evaluate.

Regardless of JB numbers, entry into an aircraft is likely if beetles fly near or rest on the aircraft's exterior surfaces, boarding ladders, or similar items. This situation should be considered high-risk.

If a 15-minute visual survey, done under optimal conditions around an aircraft-operating area, finds two or more live adults, aircraft infestation is highly likely.

Detections in JB-free Areas: Consider the third criterion: Are infested aircraft arriving in JB-free areas?

A single JB interception in a JB-free area indicates a potentially high-risk situation at the originating airport or at a previous stop-over airport (or airports); therefore, regulation at a high-risk infested airport should be considered.

(Information on responding to a detection in a JB-free area is in a following section: Monitoring Airports in a JB-free Areas.)

Step 2: Determine which specific areas, carriers, aircraft, and containers are at risk.

Use the risk criteria presented in Step 1 to determine the risk from various factors: individual aircraft operating areas, carriers, aircraft at high-risk times, aircraft at low-risk times, containers stored outdoors, containers stored indoors, and various other factors.

Step 3: Evaluate mitigating measures.

If one or more high-risk factors have been identified, evaluate all mitigating measures that, either alone or in combination, would reduce each high-risk factor and produce a low-risk situation. Examples of mitigating measures are reducing JB populations in the airport and in surrounding areas, rescheduling aircraft loading and flight times to low-risk times, keeping all at-risk aircraft closed whenever possible, using excluders whenever an at-risk aircraft is opened, moving at-risk aircraft and cargo operations to a low-risk part of the airport. These examples and other mitigating measures are discussed in detail in the following chapter: Control Measures.

Prompt application of one or more mitigating measures may allow an airport to remain unregulated.

Step 4: Complete an EAN (if necessary)

If an airport or a carrier needs to be regulated to prevent JBs being transported to the JB-free areas, complete an Emergency Action Notification (EAN). Information on the EAN and other required activities is in the following section: Using the Emergency Action Notification (EAN) and Other Activities>

Using the Risk Criteria for Decision-making

Cooperating with State department of agriculture personnel, the State Plant Health Director (SPHD) will review the situation at the airport using an evaluation based on the three criteria. The SPHD can decide to regulate all or part of the airport.

Potential High-risk Airports

At airports expected to become high-risk, PPQ officers should determine the flight numbers and airlines of high-risk aircraft. High-risk aircraft are aircraft that fly to the Protected States and other JB-free areas; these aircraft may be exposed to infestation or may carry cargo exposed to infestation. High-risk aircraft may require safeguarding and/or treatment if a high-risk population of JB develops. High-risk aircraft depart to the JB-free areas during the hours of greatest beetle activity, usually between 7 am and 8 pm.

NOTICE

High-risk aircraft include any aircraft with a destination anywhere in the JB-free area; even if the the aircraft has intermediate stops in other airports along the way to the destination in the JB-fee area, the aircraft is still high-risk.

Before control procedures are needed, train airline and airport personnel in control procedures. Coordinate all training with the State Plant Regulatory Official (SPRO). Know in advance how to apply all Federal and State pesticide regulations.

Airport Monitoring and Classification

Using the Emergency Action Notification (EAN) and Other Activities

If aircraft going to JB-free areas are likely to be infested, the State Plant Health Director (SPHD), an APHIS official, may designate any airport within a quarantined State as a regulated airport. The distinct possibility that JB-infested aircraft are likely to spread the Japanese beetle to JB-free areas justifies this regulation.

Issuing the EAN

After determining that an airport is high-risk and must be regulated, the SPHD (or a designee) will immediately complete and issue an Emergency Action Notification (Appendix G, PPQ Form 523) to the following individuals:

- The official in charge of the airport
- Officials in charge of airlines sending aircraft during daylight hours to JB-free areas
- The Regional Director responsible for the originating airport
- PPQ personnel responsible for treatments

Using electronic mail, the Regional Director (or a designee) will inform the following individuals:

- Assistant Deputy Administrator, Pest Detection and Management Programs, Riverdale, MD
- Other Regional Directors
- All State Plant Regulatory Officials (SPROs) affected by the high-risk situation
- The State Plant Health Directors (SPHDs) in various States
- Specialists at the Otis Plant Protection Center

Appendix H contains a list of individuals who should be notified when a high-risk situation exist.

Regulated Airport Report

When an airport is regulated, the National Program Manager of the Japanese Beetle Program (USDA-APHIS-PPQ) will inform all interested parties by circulating the following report by fax or electronic mail:

Name of Airport	
Date Regulated/Time:	Date—00:00 Hours
Date De-regulated/Time:	Date—00:00 Hours

SPHDs responsible for regulated airports will inform their Regional Directors through the Regional Program Managers of all actions taken. If additional actions are necessary, the SPHDs will notify the Regional Program Managers.

The Regional Directors will then notify the Plant Detection and Management Programs staff of actions taken and airlines involved.

High-Risk Flights

When an airport is regulated, the SPHD (or a designee) must obtain schedules listing all high-risk flights. The high-risk flights are usually those departing during daylight hours (between 7 am and 8 pm) for JB-free areas; however, high-risk flights may depart at other times. The SPHD (or a designee) will then distribute these schedules to APHIS personnel and SPROs in the threatened JB-free areas. The SPHD will also distribute schedules of these flights to APHIS personnel and SPROs in infested States, particularly if the flights originated in another infested State.

Unscheduled Flights

When flights are unscheduled, personnel at the originating airport will notify personnel at the destination airport *at least 1 hour before departure of the flight.* This procedure for unscheduled flights is for both commercial and military flights. The SPHD may omit the 1-hour notification requirement on a case-by-case basis. For detailed information, see 301.48-4 para. (d).

Arranging Control Measures

To protect JB-free areas, the SPHD must implement control measures at the regulated airports. These control measures may change the airport from regulated to non-regulated. Control measures may be (1) mitigation procedures, such as rescheduling aircraft loading and flight

times to low-risk times, and loading aircraft in part of the airport where the JB population is low and (2) treatments, such as treating host plants.

Once an airport is regulated, the SPHD will inform airline officials that control measures, which may or may not be treatments, must start as soon as possible. The SPHD will inform the airline officials that PPQ personnel will train the airline personnel for aircraft treatments at the regulated airport, if needed.

When airport regulation is likely, the SPHD must contact airline personnel before the start of control measures to discuss the control procedures and possible training needs.

More information on control measures is in Chapter 5: Control Measures.

Military Cooperation

Authorization for military cooperation is contained in a Joint Armed Forces Directive, *Quarantine Regulations of the Armed Forces* (SECNAV Instruction No. 6210.2A, Army Regulations No. 40-12, and Air Force Instruction 48-104). This document is available at the following website:

http://www.hqusareur.army.mil/opm/customregs.html

If a SPHD has any difficulty in obtaining cooperation, the SPHD will call the Commanding Officer's attention to the provisions of Section I, No. 3 of these joint Army-Navy-Air Force regulations.

Cancellation of Emergency Action Notification (EAN)

APHIS personnel may cancel the regulated status of an airport; this cancellation returns the airport to non-regulated status.

Terminating the High-risk Situation

Authorized Inspectors, PPQ officers and other personnel, will keep the SPHD informed of JB activity around the airport and in aircraft-operating areas. When the SPHD determines that a high-risk situation no longer exists, the SPHD can change the status of the regulated airport.

Revoking the EAN

When the high-risk situation no longer exist, the SPHD will complete Block 16 of the EAN, Action Taken. As examples, the action taken may be application of treatments or monitoring to detect a fall in the threatening population. Copies of the updated EAN will go to affected airline and airport officials.

The SPHD responsible for the recently deregulated airport will inform the Regional Director through the Regional Program Manager of the revocation of the EAN. Using electronic mail, the Regional Director will notify the following individuals:

- other Regional Directors
- the National Program Manager for Japanese Beetle (USDA-APHIS-PPQ Pest Detection and Management Programs, Riverdale, MD)
- State Plant Health Regulatory Officials (SPROs)

Reporting the Deregulation of an Airport

When an airport is deregulated, the National Program Manager (or a designee) will inform all interested parties by completing and distributing the following report:

Name of Airport	
Date Regulated/Time:	Date—00:00 Hours
Date De-regulated/Time:	Date—00:00 Hours

Airport Monitoring and Classification

Monitoring and Managing Airports in JB-free Areas

To maintain a JB-free status, airports in the JB-free area are monitored, especially in the Protected States.

Airport Monitoring

The following methods, alone or in combination, are often used to monitor airports in JB-free areas, particularly when the airports have repeated interceptions:

- Trapping
- Inspections of high-risk flights from regulated airports
- Inspections of high-risk flights from unregulated airports that were regulated in the past

Depending on the resources available, the SPHD will determine which monitoring method, or methods, will be used.

Personnel at airports in the JB-free areas will arrange surveys of aircraft originating from JB-infested areas, particularly those aircraft originating from regulated airports.

Because of the use of treatments, interception of Japanese beetles, either dead or moribund, on aircraft from regulated airports are to be expected. However, if live healthy beetles are intercepted on aircraft from regulated airports, a high-risk situation exists.

If live healthy beetles are intercepted on aircraft from unregulated airports, a high-risk situation exists.

For additional information on inspection procedures for JBs in Protected States, refer to the *Best Practices Guidelines*.

Use of the JBAIR

When inspecting flights from infested airports, the Japanese Beetle Aircraft Inspection Record (JBAIR) is used to collect data. A completed JBAIR will specify the specific location on the infested aircraft where beetles were found and the condition of the beetles when found.

Information collected on the JBAIRs will be entered into the Lotus Notes "Japanese Beetle Interception" database maintained by PPQ; in return, because of the timely submission of information from the JBAIRs, reports will be available for PPQ, State, and industry personnel. The reports will enable PPQ, State, and industry personnel to evaluate (1) how effective exclusion procedures are and (2) how effective pesticide treatments are.

A copy of the JBAIR is in Appendix L.

Responding to Interceptions from Unregulated Airports or Carriers

Interceptions of JBs on aircraft from unregulated airports or from unregulated carriers is an indication that a high-risk situation probably exists and that regulation in the JB-infested area is probably necessary.

Results of inspections are to be recorded on the JBAIR and entered into the "Japanese Beetle Interception" database.

When Japanese beetles are intercepted at an airport in the JB-free area and the origin of the beetles from an infested airport is verified, the SPHD, by sending a copies of the JBAIR, will immediately notify the following individuals:

- the SPHD and SPRO responsible for the airport from which the flight originated
- the SPRO, the State Plant Regulatory Official
- the Regional Director responsible for the airport in the JB-free area
- the Regional Director responsible for the originating airport

Within twenty-four hours, the SPHD at the originating airport will determine if a high-risk situation exists by following the steps in the prevoius section: Determining the Risk at JB-infested Airports. After completion of the determination, the SPHD responsible for the originating airport will immediately inform the SPHD responsible for the receiving airport of the actions that have been taken (monitoring results and/or mitigating measures implemented).

If the aircraft upon which the interception was made transited two or more airports within the JB-infested States, and the origin of the beetle cannot be verified, the SPHD must notify the SPHDs responsible for all the transited airports. The SPHDs of the transited airports will follow the steps mentioned previously to determine which of the transited airports are high-risk.

When JBs are found, the SPHD responsible for the receiving airport (or a designee) may take appropriate action to safeguard the receiving airport. Appropriate action may include one or more of the following actions:

- Monitoring unloading activities
- Terminating all unloading activities
- Issuing an EAN
- Treating the infested aircraft and/or cargo immediately
- Closing the infested aircraft and treating the aircraft and/or cargo at a later destination

Generally, the SPHD responsible for the receiving airport (or a designee) will issue an EAN and the aircraft will be treated.

Responding to Interceptions From Regulated Airports or Carriers

Interceptions of dead or moribund JBs on aircraft from regulated airports are to be expected. Finding live JBs in aircraft from from regulated airports and from regulated carriers is an indication that safeguarding procedures were **not** followed correctly or were **not** completely effective.

Results of inspections are to be recorded on the JBAIR and entered into the “Japanese Beetle Interception” database.

When Japanese beetles are intercepted at an airport in the JB-free area and the origin of the beetles from a regulated airport or regulated carrier is verified, the SPHD, by sending a copies of the JBAIR, will immediately notify the following individuals:

- the SPHD and SPRO responsible for the regulated airport or for the regulated carrier
- the SPRO, the State Plant Regulatory Official
- the Regional Director responsible for the airport in the JB-free area
- the Regional Director responsible for the originating airport

Within twenty-four hours, the SPHD at the originating airport will determine the effectiveness of of the safeguarding procedures. In the determination, the SPHD will consider the following questions and similar questions:

- How effective are the mitigating procedures being used?
- Are all mitigating procedures being used correctly?
- Are treatments effective when used correctly?
- Are treatments being applied correctly?

After completion of the determination, the SPHD responsible for the originating airport under quarantine or the regulated carrier will immediately inform the SPHD responsible for the receiving airport of the actions that have been taken (determination results and/or mitigating measures implemented).

If the aircraft upon which the interception was made transited two or more airports within the JB-infested States, and the origin of the beetle cannot be verified, the SPHD must notify the SPHDs responsible for all the transited airports. The SPHDs of the transited airports will follow the steps mentioned previously to determine which of the transited airports are high-risk.

When JBs are found, the SPHD responsible for the receiving airport (or a designee) may take all appropriate action to safeguard the receiving airport; for example, the SPHD responsible for the receiving airport (or a designee) may issue an EAN and the aircraft may be treated (or retreated). (For appropriate actions, see the last paragraphs in Responding to Interceptions from Unregulated Airports or Carriers.)

High-Risk Flights

When an airport is regulated, the SPHD (or PPQ officer) responsible for a destination airport in a JB-free area should receive schedules listing all high-risk flights, those flights departing during daylight hours for the destination airport and likely to be infested. The SPHD responsible for a destination airport will use these schedules of high-risk flights to plan inspections of the arriving flights.

When flights are unscheduled, personnel at the originating airport will notify personnel at the destination airport *at least 1 hour before departure of the flight.* This procedure for unscheduled flights is for both commercial and military flights. The Port Director may omit the 1-hour notification requirement on a case-by-case basis. For detailed information, see 301.48-4 para. (d).

5

Japanese Beetle Program Manual

Control Measures

Overview

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Overview

Goal

The ultimate goal of airport control procedures is to prevent the JB from entering aircraft going to the protected Western States.

Methods

Depending on the situation, use the following methods, alone or in combination, to control the JB at infested airports:

- Lowering the JB population to a non-threatening level
- Excluding beetles from the at-risk aircraft
- Treating infested aircraft

Lowering the JB Population

Methods that will lower the JB population are the following:

- Applying fast-acting insecticides to host plants to control adults
- Applying insecticides to the soil to control larvae
- Introducing biocontrol agents (however, control may develop slowly, if at all)
- Destroying host plants

The JB population may be lowered throughout the infested airport or only in a portion of the infested airport.

Excluding Beetles from High-risk Aircraft

Beetles can be excluded by the following techniques:

- Using physical barriers, such as enclosed walkways
- Scheduling flights when the beetles are not flying (or flying in reduced numbers)
- Changing aircraft-operating areas to areas less attractive to the JB
- Positioning aircraft in ways less attractive to the JB
- Safeguarding cargo and baggage (as examples, keeping containers closed, storing containers in enclosed areas)

Refer to the *Best Practices Guidelines* (pages 5 to 15) fore additional information on excluding JBs.

Treating Infested Aircraft

Currently two insecticides, d-phenothrin and cyfluthrin (Tempo®), are authorized for use on infested aircraft. This chapter contains information on the use of these insecticides.

Bendiocarb (Ficam® W; Ficam® Plus) is authorized for use on infested aircraft; however, bendiocarb is **not** being produced. Existing stocks may be used.

Initiating Control

Ideally, control will begin before a JB population reaches a high-risk level requiring regulation; therefore, control should be both long- and short-range.

Long-range control will emphasize integrated pest management (IPM) practices that will keep the JB population below the high-risk level. For example, long-range control will use biocontrol agents, such as the bacterium that causes milky spore disease, to keep JB populations below the hazardous level. As another example, long-range control will use landscape planning at the airport to prevent the planting of host plants near aircraft-operating areas.

Short-range control will emphasize the quick reduction of a population at the high-risk level. For example, a quick-acting soil insecticide will quickly reduce a high population of grubs to a non-threatening level. As another example, foliar treatment of hosts will reduce adult population levels. As a third example, removal of host plants will reduce adult population levels.

When designing a control program for JB, it is wise to seek advice from IPM consultants, entomologists, cooperative extension personnel, and other professionals. Carrier have hired consultants who develop IPM programs that emphasize exclusion and are suitable for specific airports.

Monitoring Results

To monitor the effectiveness of the aircraft and grounds treatments, use one or more of the following means:

- Detections on aircraft at the infested airport
- Detections on aircraft arriving in the JB-free area
- Larval surveys (See **Airport Monitoring and Classification** and **Appendix F**.)
- Adult Visual Surveys (See **Airport Monitoring and Classification**.)
- Trapping (See **Airport Monitoring and Classification**.)

Control Measures

Safety Procedures

General Safety Procedures

Ideally, training of potential applicators should start before hazardous conditions exist.

To protect the health of the applicators and all who could be exposed, all applications of insecticides must follow the recommended Federal and State procedures. For example, safety glasses must be worn when treating baggage and cargo areas.

For additional information and advice on procedures, contact the Otis Plant Protection Center:

Otis Plant Protection Center, Bldg. 1398
Otis ANGB, MA 02542
Tel: (508) 563-9303
Fax: (508) 564-4398

Safety Precautions for Aircraft Safety

- Always wear long sleeves and pants.
- Never apply any chemical treatment in the presence of passengers, crew, or animals.
- If treating the passenger compartment, always delay catering until after the treatment.
- Take precautions when applying d-phenothrin aerosols. Have applicators seek fresh air immediately if they feel light-headed or dizzy when applying the aerosol.
- Collect empty pesticide containers; to dispose of containers, follow label directions.
- When applying insecticide, wear safety glasses. Protective gloves and respiratory equipment are recommended but not required.
- After applying insecticide, wash hands before smoking or eating. Never smoke or eat while applying insecticides.

Control Measures

Treatments for Aircraft

Insecticides

Appendix I contains additional information on insecticides and distributors. Before using any insecticide, read the instructions on the label.

Only two insecticides that are registered for use on aircraft are currently being produced. One is 10% d-phenothrin which is applied as an aerosol. The other is cyfluthrin which is applied as a spray.

Bendiocarb

Bendiocarb is no longer in production; however, existing stocks may be used to treat aircraft.

Sold under the trade name of Ficam® W by Agrevo Environmental Health, Ficam® W is a 76% wettable powder insecticide approved for use on aircraft. Usually used on unloaded cargo aircraft, the bendiocarb solution is applied to areas where the beetles may be found.

The Ficam® Plus formulation is also usable on aircraft. This formulation contains bendiocarb plus pyrethrins and piperonyl butoxide.

Beta-Cyfluthrin

Beta-cyfluthrin is the active ingredient in Tempo SC Ultra insecticide which may be used for pests in aircraft.

Two restrictions appear on label for Tempo SC Ultra:

- "Do not use in aircraft cabins."
- "May be applied to carpet or upholstery in the cargo area only where there is no prolonged human contact."

d-Phenothrin, 10%

The insecticide registered for use as an aerosol on aircraft is 10% (10 percent) d-phenothrin. Usually, application of this insecticide is either to passenger-carrying aircraft (when unoccupied) or loaded cargo aircraft (when unoccupied).

WARNING

d-Phenothrin is for use by or under the direction of Federal/State personnel. Only personnel trained by the U.S. Department of Agriculture (USDA) can apply this insecticide. If trained by the USDA, airline personnel can apply this insecticide.

d-Phenothrin is available from the Otis Plant Protection Center (see page 5-5 for address).

With the 10 percent formulation, the rate of application is 8 grams per 1,000 cubic feet. Without an extender, the aerosol can is calibrated to dispense 5 grams per second. Therefore, 8 grams per 1,000 cubic feet will take 1.6 seconds to dispense. When using an extender, the rate is cut in half to 2.5 grams per second; therefore, to apply the same amount, double the application time.

The use of respirators is recommended (but not required).

Calculations for the 10% d-Phenothrin Aerosol

To determine the amount of material required to treat an aircraft, first find the cubic capacity and then the seconds of application time.

1. Determine the number of cubic feet in the aircraft.

Information on the volume of commonly-used aircraft is in the PPQ *Treatment Manual* in Section VI; this manual is a USDA-APHIS document.

Information on volume in cubic feet, is also in Appendix J; however, to be absolutely certain of the volumes of the aircraft holds, pay attention to the following note:

NOTICE

Always ask the engineering department or ground crew for information on the volumes of holds, especially when unsure. Aircraft are often altered for various reasons. As an example, extended-range aircraft (ER aircraft) carry additional fuel tanks or larger fuel tanks. This alteration and other alterations change the volume of the holds.

2. Divide the cubic feet present in the aircraft by 1,000 to obtain the units of 1,000 cubic feet. With 10% d-phenothrin, each unit of 1,000 cubic feet will require 8 grams which requires 1.6 seconds of treatment.

Example: If the aircraft cabin has a volume of 10,800 cubic feet, then:

$$\frac{10{,}800}{1{,}000} = 10.8 \text{ units of } 1{,}000 \text{ cubic feet}$$

1.6 seconds x 10.8 = 17.3 = 17seconds of dispensing time

Dispensing d-Phenothrin Aerosol

In passenger aircraft with two aisles, it is advantageous to have two individuals dispensing the material at the same time.

When dispensing the aerosol, use a stopwatch, a wristwatch with a second hand, or count aloud using the technique 1001, 1002, etc.

Accurate timing not only insures that the proper amount is dispensed, but also gives a better chance of obtaining an equal distribution.

When applying, keep the dispensing valve fully depressed.

To avoid wetting surfaces, hold the nozzle at least 18 inches away from all surfaces.

Start (perkhaps with another applicator) 10 feet from the end of the aircraft. While backing slowly through the aircraft, dispense aerosol in a sweeping motion with cans pointed upward at a 45° angle.

TABLE E-3-1: Determining the procedure to use for treating *passenger aircraft* compartments

If the compartment is a:	Then:
Lavatory	1. Seal off. 2. Remove beetles.
Cockpit	
Galley	
Cargo Hold	1. Seal off. 2. Spray with d-phenothrin.
Passenger Cabin	1. Seal off. 2. When unoccupied, spray with d-phenothrin.

WARNING

Never treat passenger compartments when passengers are inside.

Passenger Compartment Procedure—d-Phenothrin Aerosol

This procedure for treating a passenger compartment will *not* normally be applied in commercial aircraft passenger compartments destined to the Protected States.

NOTICE

With slight modification (Step 6), this procedure can be used with military aircraft which will be carrying passengers,

To treat a passenger compartment, use the following procedure:

1. Vacuum clean before treatment.
2. Close cockpit windows. Inspect cockpit area thoroughly and remove any JB found. Keep windows closed until departure. Close cockpit door to prevent aerosol from entering.
3. Close off the galleys with barriers (doors, curtains, plastic sheets, or prefabricated structures) to prevent aerosol particles from entering. Remove any JB found.

NOTICE

Curtains must be full-length to prevent the entrance of aerosol particles into the galley. If the curtains are not full-length, use other means to seal the entrance. Airlines should provide materials, such as polyethylene, to seal galley areas.

4. Outside of the galley areas, cover the following items with an impervious material (such as polyethylene):
   - ❖ Water fountains
   - ❖ Beverage and food preparation surfaces
   - ❖ Exposed oxygen masks
5. Open doors to lavatories and carefully inspect lavatories. Remove any JB found then close lavatory doors.
6. Check aisles and remove all obstacles.
7. Put on safety glasses (and respirator, if desired).
8. Stop all aircraft ventilation systems prior to treatment. Arrange to keep the ventilation system off for 10 minutes after the treatment.

9. Close aircraft entrance doors.
10. Start (perhaps with another applicator) 10 feet from the end of the aircraft. While backing slowly through the aircraft, dispense aerosol in a sweeping motion with cans pointing upward at a 45° angle. Do not spray any closer than 18 inches to any object.
11. Close all doors after exiting and keep the aircraft closed for 15 minutes post-treatment.
12. After the 15-minute post-treatment period, start the aircraft ventilation system. Ventilate the aircraft for 15 minutes before boarding passengers, crew, or ground personnel. If aerosol particles are still noted in the air after the 15-minute ventilation period, the aeration should continue until the particles disappear. With most ground air-conditioned trucks a complete air change can occur within 3 to 5 minutes.

WARNING

The individual who starts the ventilation equipment must wear safety glasses.

NOTICE

Some military aircraft (used to carry passengers) do not have a ventilation system other than a forced air system when in flight. If the military aircraft do not have a ventilation system, treatment well before use is desirable.

After treatment, safeguard the aircraft until departure.

Post-treatment Cleanup Procedure for d-Phenothrin Aerosol

1. Do not remove barriers from galleys until catering is completed; beetles can enter during the catering process.
2. Do not open cockpit doors.
3. Sweep after treatment; *never* vacuum.
4. If lavatory doors were left open during treatment, wipe the seat surfaces with a clean, damp cloth and discard exposed facial tissue and soap.
5. Remove covers used to protect specific items outside the galley (for example, drinking fountains).
6. After the cleanup, have all applicators wash their hands, faces, and arms thoroughly before smoking, eating, or drinking.

Maintaining a Pest-Free Condition

After treatment of a passenger compartment, keep the aircraft JB-free by the following procedures:

- Monitor the entrance to the aircraft to determine if beetles are entering.
- Use enclosed walkways to board passengers either from the terminal or from the vehicles that carry passengers to the aircraft.
- Remove any beetles that enter the aircraft and destroy them.
- Keep the barrier (closure, curtain, or door) from the galley to the inside of the aircraft closed until after catering. After catering, thoroughly inspect for beetles in the galley area.

When airline personnel notice an exceptionally heavy population of beetles, they should notify a PPQ officer who will determine what further measures are necessary.

Treating Loaded and Unloaded Cargo Aircraft

Whenever possible, treat cargo aircraft before loading. Treatment before loading allows penetration of the insecticide to cargo areas and nooks that become inaccessible after loading. Treatment before loading is desirable, particularly when JB-free cargo will be loaded.

TABLE E-3-2: Decision table for determining the procedure to use for treating *cargo aircraft* compartments.

If the Compartment Is a:	And:	Then:
Lavatory		1. Seal off. 2. Remove beetles.
Cockpit	→	
Galley		
Cargo hold	Unloaded *and* cargo is to be carried	1. Seal off. 2. Treat with bendiocarb *or* spray with d-phenothrin.
	Unloaded *and* personnel (and cargo) are to be carried	1. Seal off. 2. Treat with bendiocarb *or* spray with d-phenothrin when unoccupied.
	Loaded with cargo	1. Seal off. 2. Spray with d-phenothrin.

Treating Unloaded Cargo Aircraft with Beta-Cyfluthrin

To treat unloaded cargo aircraft with beta-cyfluthrin (or bendiocarb), use the following procedure:

1. Clean the aircraft if needed.
2. Cover sensitive equipment in the cargo hold.
3. Put on safety glasses (and respirator, if desired).
4. Treat all vertical surfaces, 1 foot above the horizontal surfaces.
5. Treat all horizontal surfaces starting from within the cargo area and working towards the hatch.
6. Treat the ball-matt area (the area where the cargo first enters the aircraft).

Treating Loaded Cargo Aircraft with d-Phenothrin Aerosol

Loaded aircraft that stand open during the day must be treated, regardless of loading time. Beetles often fly into and remain in open aircraft. Use the following procedures to treat loaded aircraft.

NOTICE

Cover all sensitive equipment that will be exposed to the d-phenothrin aerosol.

NOTICE

Military (and other) cargo is often stored outside on pallets for lengthy periods. Beetles often rest overnight on the cargo pallets. Loading the aircraft with JB-infested pallets will infest the aircraft. Therefore, be sure to treat the holds of aircraft that contain cargo pallets that have been stored outside and are likely to be JB-infested. After treatment, remove all JBs.

Procedures for Treating Loaded Baggage/Cargo Holds with Aerosol

Two procedures are available for treating loaded baggage/cargo holds in aircraft carrying passengers or cargo. These are the recommended procedures when treating holds after loading cargo and baggage. When treatment is done after loading, do not deduct space occupied by cargo and baggage. If animals are not being shipped, aeration is not required in the luggage compartments of passenger aircraft.

Selection of the correct procedure depends on whether or not live animals are being shipped. The two procedures follow.

Treating Baggage/Cargo Holds With Live Animals Being Shipped

To treat a baggage/cargo hold when live animals, such as pets, will be shipped, use the following procedure:

1. Remove the live animals before treatment.
2. Put on safety glasses (and respirator, if desired).
3. Treat the baggage/cargo hold.
4. Keep baggage/cargo hold closed for 15 minutes.
5. Open the hold door(s); use a mechanical barrier to protect the treated hold.
6. Aerate the baggage/cargo hold for 15 minutes.
7. Reload the animals.
8. Close hold door(s).

Treating Baggage/Cargo Holds Without Live Animals Being Shipped

To treat a loaded baggage/cargo hold without live animals being shipped, use the following procedure:

1. Visually inspect baggage/cargo hold before loading, collecting and destroying all JB found.
2. Visually inspect all baggage or cargo as it is being loaded. The loading will take place prior to treatment.
3. Calculate the rate. Use the same rate and procedures followed for baggage/cargo areas as cargo areas. Do not deduct the space occupied by baggage and cargo in computing the required treatment rate.
4. Put on safety glasses (and respirator, if desired).
5. Dispense the insecticide. In small holds, open the hatch just enough to allow a hand and the aerosol container inside; as an alternative, apply through open porthole, if available, in the hatch. Many holds are small; therefore, applicators may treat these small areas by standing at the hatch and directing the spray either aft or forward.

After treatment, close the hatch immediately. Unless animals are to be loaded, aerating the holds is not necessary.

Treating Unloaded Baggage/Cargo Pods with d-Phenothrin Aerosol

To treat unloaded baggage/cargo pods with d-phenothrin aerosol, use the following procedure:

1. Select pods that are in good repair and without hand holes, so that the pods are relatively air tight.
2. Put on safety glasses (and respirator, if desired).
3. Slightly open the pod door.
4. Spray for 1 second.
5. Keep pod closed for 15 minutes.
6. Open and aerate the pod for 15 minutes.
7. Load baggage or cargo and close pod.

Precautions for Aircraft Transiting High-risk Airports

The following precautions must be used for aircraft transiting high-risk airports:

- Use enclosed walkways to board passengers. Always keep the enclosed walkway tight against the aircraft.
- Keep cockpit windows closed.
- Seal off the galley(s) if the aircraft is to be catered at the hazardous airport. Inspect galleys after catering but before removing barriers separating the galleys from the cabins.
- Keep cargo holds closed except during loading and unloading.

Timing an Insecticide Application

When operating under the following conditions, aircraft *may not* require treatment:

- When arriving and leaving during the same night
- On cool days below 73° F (23° C)
- On hot days above 104° F (40° C)
- On windy days
- On rainy days

However, even under the conditions mentioned above, the treatment of aircraft may be necessary. Beetles often fly when the temperature is high, when the temperature is low, or when the day is windy. On rainy

days, JB may infest cargo stored outside. Therefore, based on a case-by-case evaluation of the situation, the State Plant Health Director will decide whether or not to treat at-risk aircraft.

Treat aircraft no more than 1 hour before loading.

PPQ Form 250 - Aircraft Clearance or Safeguard Order

If requested by personnel at the destination airport, issue an Aircraft Clearance or Safeguard Order to the pilot after treating an aircraft. However, if personnel at the destination airport do not request an Aircraft Clearance or Safeguard Order, do not issue the document.

Appendix K shows PPQ Form 250, Aircraft Clearance or Safeguard Order.

Exclusion Devices/Excluders

In certain situations, exclusion devices will prevent the entry of beetles into aircraft. Certain exclusion devices called “excluders” are commonly used. Excluders are vitually enclosed compartments with an open side designed to fit snugly against the surface of an aircraft. Hatches may be opened within the excluder to permit loading and unloading.

Passengers

Exclusion devices physically exclude beetles from the cargo, baggage, or passenger compartments of aircraft. Examples of exclusion devices are enclosed walkways and bus-type vehicles for the loading and unloading of passengers. When used, these exclusion devices fit tightly against the aircraft.

When exclusion devices are used for passenger boarding, after the passengers have boarded, thoroughly inspect the passenger entrance to within 10 feet of the openings. Within the aircraft, pay special attention to the floor and window sills. Remove any beetles found from the aircraft.

Cargo

Efective exclusion devices have been developed for cargo aircraft by carriers faced with a JB entry problem. These exclusion devices are excluders that are now the standard for handling cargo aircraft at high-risk airports.

General Information on Exclusion Devices

Use exclusion devices whenever possible. Even if JBs enter the aircraft, the numbers entering will be greatly reduced.

Because beetles tend to closely follow the sunny side of a fuselage, they can often be excluded by the excluders, the exclusion devices that frame open doors. When the beetles encounter the excluders, they tend to drop below the open doors.

Information on the construction of excluders is available from USDA-APHIS, Otis Plant Protection Center (508-563-9303 ext. 215). Also refer to the *Best Practices Guidelines* for additional information and pictures of excluders.

Exclusion devices can only be used when aircraft are JB-free. Do not use exclusion devices on aircraft parked at a regulated airport for cleaning or other purposes, which require exterior doors to remain open, until the aircraft are treated with an insecticide.

When exclusion devices are used, protect all openings in the aircraft from 7 am to 8 pm.

Selecting Aircraft-Operating Areas

Certain aircraft-operating areas are much more likely to attract JBs than other areas. Avoid the following aircraft-operating areas which are attractive to the JB:

- Close to moist grassy areas on light-textured soil which are favorable for egg-laying and larval development
- Close to feeding hosts for the adult beetles
- Possessing a favored sunny exposure

If areas attractive to JBs are used for aircraft operations, especially during the hours of greatest beetle activity, aircraft entries are likely.

If possible, loading areas that are less attractive to beetles should be used. Characteristics of less-attractive aircraft-operating areas are as follows:

- Isolated from areas favorable for egg-laying and larval development
- Devoid of hosts for the beetle
- Shaded rather than sunny

Positioning of Aircraft

If possible, aircraft should be positioned so that the aircraft or, at least, its doors are in the shade. Beetles prefer sunny locations and are more likely to enter if doors and hatches are exposed to the sun.

Stand-by Aircraft

The stand-by aircraft that replace aircraft on scheduled flights must be JB-free. “Tail-swapping” is the term for the replacement of one aircraft by another. When “tail-swapping” occurs, the stand-by aircraft may require treatment and safeguarding so that they are JB-free.

Control Measures

Treatments For Airport Grounds

Additional information on insecticides and distributors may be found In Appendix I.

Treatments For Larvae

Chemical Control Of Larvae

The major advantage of treating larvae (grubs) in the soil is the destruction of the grubs before they become adult beetles. The major disadvantage is the considerable expense for materials and labor.

Biological Control (Biocontrol) Of Larvae

The major advantage of biological control is the possibility of long-term reduction of the jb population to a non-threatening level. The major disadvantages are (1) long-term control may be slowly developed and (2) significant long-term control may not develop.

The various potential biocontrol organisms are not available at all times; suppliers of the organisms tend to come and go.

With varying degrees of success, the following organisms are used for biocontrol of the JB larvae:

◆ *Bacillus popilliae*	Bacterium causing milky spore disease
◆ *B. thuringiensis* (Bt)	Bt strain for the JB grub
◆ *Heterorhabditis bacteriophora*	A nematode effective against JB grubs
◆ *Steinernema glaseri*	A nematode effective against JB grubs
◆ *Tiphia vernalis*	A small wasp parasitic on the JB grub

Biocontrol agents against the larvae can be used with the biocontrol agent against the adults.

Treatments for Adults

Chemical Control of Adults

The major advantage of treating the adults (beetles) by fast-acting chemicals is a quick reduction in the adult population. The major disadvantage is that often the adults destroyed are quickly replaced by adults emerging after the treatment.

Biological Control of Adults

The solitary fly *Istocheta aldrichi* is an internal parasite of the adult JB. The female flies deposit up to 100 eggs during a period of about 2 weeks. Usually laid upon the thorax of the female beetles, the eggs hatch into maggots which bore directly into the bodies of the hosts killing the beetles. In ideal situations, this fly can suppress JB populations before the beetles can reproduce.

Removal/Reduction of Host Plants

The major advantages of removing host plants are (1) a quick reduction in the JB population threatening aircraft is often obtained and (2) long-term control is achieved by removing host plants. The major disadvantages are the aesthetic loss and environmental damage.

Control Measures

Treatments for Cargo

Safeguarding Cargo

Beetles often rest overnight on cargo pallets, cans (enclosed containers), and other devices for cargo handling; as a result, cargo stored outside for lengthly periods can become a high-risk. Therefore, safeguarding measures should be used to prevent the infestation of cargo by the JB.

Treatments for Cargo Containers

Treatments for Unloaded Baggage/Cargo Pods with d-Phenothrin

To treat unloaded baggage/cargo pods with d-phenothrin aerosol, use the following procedure:

1. Select pods that are in good repair and without hand holes, so that the pods are relatively air tight.
2. Put on safety glasses (and respirator, if desired).
3. Slightly open the pod door.
4. Spray for 1 second.
5. Keep pod closed for 15 minutes.
6. Open and aerate the pod for 15 minutes.
7. Load baggage or cargo and close pod.

A

Japanese Beetle Program Manual

Appendix A

Non-preferred Hosts and Non-hosts

Introduction

The Japanese beetle (JB) feeds sparingly or not at all on plants in the following groups:

Small Fruits

American cranberry, black huckleberry, European gooseberry, northern dewberry, northern gooseberry

Orchard Fruits

Pear, persimmon

Truck and Garden Crops

Artichoke, brussel sprouts, cabbage, cantaloupe, cauliflower, celery, onion, cucumber, eggplant, endive, carrot, pea, radish, kale, leak, lettuce, muskmelon, parsley, parsnip, peanut, potato, pumpkin, red pepper, rutabaga, salsify, spinach, summer squash, sweet potato, tomato, turnip, watermelon

Field Crops

Barley, buckwheat, hops, millet, oats, rye, timothy, tobacco, vetch, wheat

Ornamental Herbs

Adam's needle yucca, ageratum, American columbine, American germander, American pennyroyal, American waterlily, American wormseed, anise, babysbreath, bearded iris, begonia, blue false-indigo, brown-eyed-susan, butterfly violet, caladium, carnation, catnip, Chile avens, Chinese lantern-plant, Christmas-rose, chufa, cockscomb, bamboo, cosmos, mignonette, portulaca, coneflower, coralbells, cornflower, gysophila, dogtooth violet, dusty-miller, Easter lily, European columbine, evergreen candytuft, false-dragonhead, flowering tobacco, forget-me-not, foxglove, fringed iris, gaillardia, balsam, nasturtium, petunia, verbena, goldenglow, ground-myrtle,

hardy larkspur, hyssop, Iceland poppy, Japanese iris, Japanese spurge, lance coreopsis, lily-of-the-valley, mountain-bluet, motherwort, mullein, New England aster, oriental poppy, oswego-tea, oxeye daisy, Pacific bleedingheart, pampas grass, pansy, perennial pea, phlox, purple loosestrife, pyrethrum, lily, sedum, skydrop aster, small white aster, snapdragon, southern maidenhair, fern, spearmint, speedwell, spiderwort, strawflower, sweetpea, sweet scabious, sweet violet, sweet-william, tawny daylily, tiger lily, Virginia dayflower, wandering-Jew, wave aster, White-top, white turtlehead, wild bergamot

Ornamental Shrubs and Vines

American bittersweet, American bladdernut, American elder, American holly, beautyberry, border forsythia, Canada yew, Carolina allspice, Catawba rhododendron, Chinese azalea, Chinese holly, Chinese redbud, climbing euonymus, climbing hydrangea, lilac, privet, coralberry, English holly, English ivy, European cranberry bush, firethorn, gardenia, groundsel-bush, Japanese holly, Japanese honeysuckle, lantana, mockorange, mountain-laurel, matrimonyvine, panicle hydrangea, Persian lilac, pinxterbloom, azalea, rosebay rhododendron, smooth hydrangea, snowberry, swamp azalea, sweet autumn clematis, torch azalea, tubeclematis, weeping forsythia, winged euonymus, winterberry, winter honeysuckle, witchhazel

Trees

Ailanthus, Atlantic white-cedar, American arborvitae, American hazelnut, American sweetgum, balsam fir, black locust, black oak, Bolleana poplar, boxelder, butternut, Canada yew, Chinese juniper, common juniper, common smoketree, cryptomeria, Douglas fir, English yew, flowering dogwood, hemlock, Hinoki-cypress, Japanese pagodatree, Japanese yew, laurel magnolia, Lawson whitecedar, maidenhair tree, mimosa, northern red oak, Norway spruce, Oriental arborvitae, pignut hickory, post oak, red ash, red maple, red mulberry, saucer magnolia, Sawara-cypress, scarlet oak, Scotch pine, shagbark hickory, silver maple, southern magnolia, southern red oak, tuliptree, Virginia pine, western yew, white ash, white oak, white poplar

B

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Appendix B

Current Distribution of the Japanese Beetle

To obtain an updated list of the infested and non-infested areas refer to the NAPIS database:

http://www.ceris.purdue.edu/napis/pests/jb

States in U.S. Entirely Infested

The following States are entirely infested:

States	Abbreviated
Connecticut	CT
Delaware	DE
District of Columbia	DC
Illinois	IL
Indiana	IN
Kentucky	KY
Maryland	MD
Massachusetts	MA
New Hampshire	NH
New Jersey	NJ
New York	NY
North Carolina	NC
Ohio	OH
Pennsylvania	PA
Rhode Island	RI
South Carolina	SC
Vermont	VT
Virginia	VA
West Virginia	WV

States in U.S. Partially Infested

To obtain an updated list of the infested and non-infested areas refer to the NAPIS database. As of June 2004, the following States are partially infested. The States are listed in alphabetical order with their infested and non-infested counties following.

TABLE B-1-1: List of Partially Infested Areas

State	Infested Counties			Non-Infested Counties
Arkansas				
Alabama (AL)	Autauga Blount Calhoun Chambers Cherokee Chilton Clay Cleburne Colbert Coosa Cullman DeKalb Elmore Etowah	Fayette Franklin Jackson Jefferson Lee Limestone Macon Madison Marion Marshall Montgomery Morgan Randolph Saint Clair	Shelby Talladega Tallapoosa Tuscaloosa Walker Winston	All other counties
Georgia (GA)	Baldwin Banks Barrow Bartow Bibb Burke Butts Carroll Catoosa Chatham Chattahoosee Chattooga Cherokee Clarke Clayton Cobb Columbia Coweta Crawford Crisp Dade Dawson DeKalb Douglas Elbert Fannin Fayette Floyd Forsyth Franklin Fulton	Gilmer Glascock Gordon Greene Gwinnett Habersham Hall Hancock Haralson Harris Hart Heard Henry Houston Jackson Jasper Jefferson Jones Lamar Lincoln Lumpkin McDuffie Macon Madison Marion Meriwether Monroe Morgan Murray Muscogee Newton	Oconee Oglethorpe Paulding Peach Pickens Pike Polk Putnam Rabun Richmond Rockdale Schley Spaulding Stephens Talbot Taliferro Taylor Towns Troup Twiggs Union Upson Walker Walton Ware Warren Washington White Whitfield Wilkes Wilkinson	All other counties
Iowa (IA)	Black Hawk Clayton Clinton Dubuque	Floyd Johnson Lee Linn	Muscatine Page Polk Scott	All other counties

TABLE B-1-1: List of Partially Infested Areas

State	Infested Counties			Non-Infested Counties
Kansas (KS)	(But being eradicated) Crawford Jefferson Johnson	Sedgwick Shawnee Wyandotte		All other counties
Maine	All other counties			Aroostook Washington
Michigan	Allegan Barry Berrien Branch Calhoun Cass Claire Clinton Eaton Genesee Hillsdale Ingham Ionia Jackson	Kalamazoo Kent Lake Lapeer Lenawee Livingston Macomb Mason Monroe Muskegon Oakland Oceana Ottawa	Saginaw Shiawassee St. Clair St. Joseph Van Buren Wastensaw Wayne	All other counties
Minnesota	Carver Dakota Hennepin	Ramsey Scott Washington		All other counties
Mississippi	(To be confirmed) Alcorn Clay DeSoto Grenada	Lafayette Lamar Lee Monroe Tippah	Tishomingo Tunica Union Wayne Winston	All other counties
Missouri	Christian Clay Franklin Jackson	Platte Stone St. Louis St. Louis City		All other counties
Nebraska	Douglas Lancaster			All other counties
Oklahoma	Cherokee Kay Oklahoma Osage Tulsa			All other counties

TABLE B-1-1: List of Partially Infested Areas

State	Infested Counties			Non-Infested Counties
Tennessee	Anderson	Grundy	Morgan	All other counties
	Bedford	Hamblen	Overton	
	Benton	Hamilton	Pickett	
	Bledsoe	Hancock	Polk	
	Blount	Hawkins	Putman	
	Bradely	Henry	Rhea	
	Campbell	Hickman	Roane	
	Cannon	Houston	Robertson	
	Carter	Humphreys	Rutherford	
	Cheatham	Jackson	Scott	
	Claiborne	Jefferson	Sequatchie	
	Clay	Johnson	Sevier	
	Cocke	Knox	Smith	
	Coffee	Lawrence	Stewart	
	Crockett	Lincoln	Sullivan	
	Cumberland	Loudon	Sumner	
	Davidson	Macon	Trousdale	
	Decatur	Marion	Unicoi	
	DeKalb	Marshall	Union	
	Dickson	Maury	Van Buren	
	Fentress	McMinn	Warren	
	Franklin	Meigs	Washington	
	Giles	Monroe	White	
	Grainger	Montgomery	Williamson	
	Greene	Moore	Wilson	
Wisconsin	Dane			All other counties
	Door			
	Eau Claire			
	Fon du Lac			
	Kenosha			
	Milwaukee			
	Ozaukee			
	Portage			
	Racine			
	Rock			
	Sheboygan			
	Walworth			
	Waukesha			
	Wood			

States in U.S. Non-infested

Non-infested States: The following States are entirely non-infested:

States	Abbreviated
Alaska	AL
Arizona	AZ
California	CA
Colorado	CO
Florida	FL
Hawaii	HI
Idaho	ID
Louisiana	LA
Mississippi (?)	MS
Montana	MT
Nevada	NV
New Mexico	NM
North Dakota	ND
Oregon	OR
South Dakota	SD
Texas	TX
Utah	UT
Wyoming	WY

Provinces in Canada Partially Infested

The following list contains the partially infested Provinces in Canada in alphabetical order. These Provinces are followed by their infested and non-infested regional municipalities (RMs; MRCs in French), which are generally equivalent to the counties in the United States, and other areas.

Province	Infested RMs and Other Areas	Non-infested RMs and Other Areas
Ontario	Halton RM Hamilton-Wentworth RM Haldimand-Norfolk RM Niagara RM Peel RM Brant Co. Elgin Co. Essex Co. Lambton Co. Leeds and Grenville Co. Middlesex Co. Oxford Co. Simcoe Co. Stormont, Dundas, and Glengarry Co. City of Ottawa Metropolitan Toronto	All other RMs and other areas
Quebec	Brome-Missisquoi MRC Bas-Richelieu MRC Champlain MRC D'Autray MRC La Haute Yamaska MRC Le Haut Richelieu MRC Memphremagog MRC Rousillion MRC Vaudreuil-Soulanges MRC Montreal	All other RMs and other areas
Nova Scotia	West 1/2 of Halifax RM	All othr RMs and other areas

Information on infestations in Canada is available at the following website:

http://www.inspection.gc.ca/english/sci/surv/pesrave.shtml#P

Provinces in Canada Non-infested

The following Provinces are entirely non-infested:

Provinces	Abbreviated
Alberta	ALTA
Britsh Columiba	BC
Manitoba	MAN
New Brunswick	NB
Newfoundland	NFLD
Northwest Territories	NWT
Prince Edward Island	PEI
Saskatchewan	SASK
Yukon	YK

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Appendix C

Current Maps Showing JB Distribution

Distribution Maps for the Japanese Beetle

Distribution in the United States

The current map that shows the distribution of the JB is part of the Japanese Beetle Program Manual for Airports and should be placed in Appendix C. Pest Detection and Management Programs is responsible for preparing this map. More specifically, the National Agricultural Pest Information System (NAPIS) produces the distribution maps; the website is below.

The current map is obtainable at either of the following websites:

http://www.ceris.purdue.edu/napis/pests/jb/imap/jbmap.html

http://www.ceris.purdue.edu/napis/pests/jb/imap/jball.html

A map showing the regulated states at the following website:

http://www.aphis.usda.gov/ppq/maps/jbmap.html

Using counties, Appendix B contains a current list of geographical localities infested by JB.

Distribution in Canada

Areas regulated for Japanese beetle in Canada include (1) the southwestern portion of Quebec Province south of Montreal, (2) southeastern Ontario Province along the shores of the St. Lawrence, and southwestern Ontario Province in the area bounded by Lake Huron, Lake St. Clair, and Lake Erie. This last area includes the western shore of Lake Ontario. A map showing infested areas (along with a complete listing of infested regional municipalities) is at the following website:

http://www.inspection.gc.ca/english/sci/surv/mrae.shtml

D

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Appendix D

Compliance Agreement

A blank copy of the form for a Compliance Agreement, PPQ Form 519, is on the following page.

FORM APPROVED OMB NUMBER 0579-0054

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

COMPLIANCE AGREEMENT

Public reporting burden for this collection of information is estimated to average 1.25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the form. Send comments regarding this burden estimate or any other aspects of thiscollection of information, including suggestions for reducing the burden, to USDA, OIRM, Clearance Officer, Room 404-W, Washington, DC 20250. When replying refer to the OMB number and Form Number in your letter.

1. NAME AND MAILING ADDRESS OF PERSON OR FIRM	2. LOCATION
,	,

3. REGULATED ARTICLE(S)

4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS

5. I/We agree to the following:

6. SIGNATURE	7. TITLE	8. DATE SIGNED
The affixing of the signatures below will validate this agreement which shall remain in effect until canceled, but may be revised as necessary or revoked for noncompliance.		9. AGREEMENT NO. 10. DATE OF AGREEMENT

11. PPQ OFFICIAL *(Name and Title)*	12. ADDRESS
13. SIGNATURE	
14. STATE AGENCY OFFICIAL *(Name and Title)*	15. ADDRESS
16. SIGNATURE	

FIGURE D-1: PPQ Form 519—Compliance Agreement

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Appendix E

Trap and Lure Distributors

References

Additional information on the efficiency of various traps can be found in the following publications:

Alm, S., Yeh, T., Dawson, C., and Klein, M. 1996. Evaluation of trapped beetle repellency, trap height, and string pheromone dispensers on Japanese beetle captures (Coleoptera: Scarabaeidae). *Environ. Entomol.* 25(6):1274-1278.

Alm, S., Yeh, T., Campo, M., Dawson, C., and Jenkins, E., and Simeoni, A. 1994. Modified trap designs and heights for increased captures of Japanese beetle adults (Coleoptera: Scarabaeidae). *J. Econ. Entomol.* 87:775-780.

Klostermeyer, Lyle E. 1985. Japanese beetle (Coleoptera: Scarabaeidae) traps: Comparison of commercial and homemade traps. *J. Econ. Entomol.* 78:454-459.

McLane, W., Finney, J., and Ladd, T. 1987. Evaluation of traps and other techniques for controlling Japanese beetles in and around airports and nurseries. 1987 Progress Report, Otis Methods Development Center, Animal and Plant Health Inspection Service, United States Department of Agriculture. Pg. 162-182.

Trap Coordinator

USDA-APHIS employees can obtain Japanese Beetle traps from the following source:

Martha Garza
Trap Coordinator
USDA/APHIS/PPQ/RMSS
Facility Management Section
Moore Air Base
Route 3, Building 6017
Edinburg, Texas 78539

Telephone: (956) 580-7222
Fax: (956) 580-7325

Distributors

A current list of distributors is difficult to maintain, because often companies change names, change inventories, merge, or fail. Therefore, do not consider this list to be a complete list. This list is presented only to give an idea of what is available.

Biocontrol Network

5116 Williamsburg Road
Brentwood, TN 37027

Telephone: (800) 441-2847
Telephone: (615) 370-4301
Fax: (615) 370-0662
Website: http://www.biconet.com

Traps:
1. Safer Japanese Beetle traps
2. Tanglefoot Japanese Beetle traps

Gardener's Supply

128 Intervale Road
Burlington, VT 05401-2850

Telephone: (888) 833-1412
Website: http://www.gardeners.com

Trap: Catch-Can Japanese Beetle Trap
Lure: Double lure system
Comments: Bait lasts one season

Gardens Alive

5100 Schenley Blvd.
Lawrenceburg, IN 47025

Telephone: (812) 537-8650
Fax: (812) 537-5108
Website: http://www.gardens-alive.com

Traps:
1. Heavy-plastic Japanese Beetle Trap (possibly Catch-Can)
2. Yellow-plastic Japanese Beetle trap with disposable plastic tray bag

Lure: Double lure system
Comments: Also sells Trece Japanese Beetle Trap with double lure

Great Lakes IPM

10220 Church Road, NE
Vestaburg, MI 48891

Telephone: (989) 268-5693; 268-5911
Website: http://www.greatlakesipm.com
Fax: (989) 268-5311
E-mail: glipm@nethawk.com

Traps:
1. Trece Catch-Can)
2. Japanese Beetle Bag Trap Kit

Lure: Double lure system
Comments: Kits for the complete traps plus bait are available.

Hercon Environmental Products

Hercon Laboratories Corporation
P.O. Box 435 Aberdeen Road
Emigsville, PA 17318-0435

Telephone: (717) 764-1192
Fax: (717) 767-1016

Trap: Lure-N-Kill JB trap
Lure: Hercon Floratape, 3:7:3 PEP + eugenol + geraniol, Hercon Luretape with Japonilure 0.47%
Comments: The Lure-N-Kill JB trap has performed on par with the Ellisco Trap when dual lure was used. The container capacity of the Lure-N-Kill trap is 3.75 liters.

Snow Pond Farm Supply

699 Adams Street
P.O. Box 115
North Abington, MA 02351

Telephone: 781-878-5581
Fax: 781-878-5582
Website: www.snow-pond.com
E-Mail: sales@snow-pond.com
info@snow-pond.com
support@snow-pond.com

Trap: Japanese beetle trap (Catch-Can)
Lure: Double lure system
Comments: Trap is designed to last for many seasons instead of being a “throwaway” trap.

Sterling International

Sterling International, Inc.
Pest Control Products
3808 N. Sullivan Road, Bldg 16BV
Spokane, WA 99216-1616

Telephone: (800) 666-6766
Fax: (509) 928-7313
Website: http://www.rescue.com

Trap: Rescue® Japanese Beetle Trap
Lure: Double lure system
Comments: Available by the case. Contact Ann Beardon, Customer Service.

Suterra LLC

213 S. W. Columbia Street
Bend, OR 97702

Telephone: (866) 326-6737
Fax: (541) 388-3705
Website: http://www.suterra.com

Lure: BioLure®

The Tanglefoot Company

314 Straight Avenue, SW
Grand Rapid, MI 49504-6485

Telephone: (616) 459-4139
Fax: (616) 459-4140
Website: http://www.tanglefoot.com
Email: tnglfoot@aol.com

Traps:
1. Xpando traps
2. TBC traps

Lure: Double lure system

Trece Incorporated

P.O. Box 129
Route 1, Box 1765
Adair, OK 74330

Telephone: (866) 785-1313
Fax: (918) 785-3063
Website: http://www.trece.com

Trap: Japanese Beetle Xpando Trap
Lure: Double-Lure System

NOTICE

Traps can be made from large plastic milk jugs; these traps with dual lures are as efficient as the commercial traps mentioned above.

U-Spray, Incorporated

4653 Highway 78
Lilburn, GA 30047

Telephone: (770) 985-9388
Fax: (770) 985-9319 (or if ordering (800) 800-1770)
Website: http://www.bugspray.com

Trap: SureFire Japanese Beetle Trap
Lure: JB bait
Comments: Offers other products to control Japanese beetle.

Woodstream Corporation

P.O. Box 327
69 N. Locust Street
Lititz, PA 17543-0327

Telephone: (800) 800-1819 or (717) 626-2125
Fax: (717) 626-1912 (If ordering 800-800-1770)
Website: http://www.woodstreamcorp.com/
Email: consumercare@woodstream.com

Trap: Safer Japanese Beetle Trap (70102)
Comments: Purchased SureFire/Safer products

F

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Appendix F

A Technique for Larval Surveys

Need for Larval Survey

When only larvae are present, a rapid and accurate method is desirable for estimating population density. The method must be able to classify populations into those that need control and those that do not.

In the following sequential sampling plan, the number of samples to be taken is **not** fixed; the required number of samples is determined by the cumulative total from the initial samples.

Larval Stage Requirement

This sequential sampling plan is for 2nd instar populations of JB. According to Vittum (1986), a population will be almost completely 2nd instar around the last day of August in New England (about 1 month after the midpoint of the flight period). Sampling was done in August in New Jersey.

Size of Sample

Each sample consists of 1 square foot (sq ft) of turf collected and examined for larvae to a depth of 4 to 5 inches.

Time Requirement

The time required to examine one sample is brief, around 15 minutes.

Control Threshold

Control of the 2nd-instars of JB is recommended when the average larval count is greater than 3 per sq ft; control is not required when the count is less than 1 per sq ft.

Using Table F-1 on the next page, sampling should cease when the cumulative number of larvae falls within the category of “treatment not required” or “treatment required.”

Additional Information

Additional information can be found in the following publication:

Ng, Y. S., Trout, J. R., and Ahmad, S. 1983. Sequential sampling plans for larval populations of the Japanese beetle (Coleoptera: Scarabaeidae) in turfgrass. *J. Econ. Entomol.* 76:251-253

TABLE F-1-1: Sequential sampling table for treatment decisions on 2nd instars of the JB larvae in turfgrass

	CUMULATIVE NUMBER OF LARVAE			
	10 Percent Error Rate		5 Percent Error Rate	
No. of Samples	Treatment not Required	Treatment Required	Treatment not Required	Treatment Required
1	[1]	6	[1]	7
2	[1]	8	[1]	9
3	1	9	[1]	11
4	3	11	1	13
5	4	13	3	14
6	6	15	5	16
7	8	16	6	18
8	10	18	8	20
9	11	20	10	21
10	13	22	12	23
11	15	23	13	25
12	16	25	15	26
13	18	27	17	28
14	20	28	18	30
15	22	30	20	32
16	23	32	22	33
17	25	34	24	35
18	27	35	25	37
19	29	37	27	39
20	30	39	29	40

1 Decision cannot be reached.

G

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Appendix G

PPQ Form 523 Emergency Action Notification (EAN)

Use of the EAN

Use the Emergency Action Notification (EAN; PPQ Form 523) when either of the following conditions occurs:

- When a JB-infested aircraft is intercepted at an airport in the JB-free States
- When aircraft leaving an airport in the JB-infested area are likely to be JB-infested

When the first condition occurs, use the EAN to obtain treatment of the infested aircraft.

When the second conditions occurs, use the EAN to regulate the hazardous airport.

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Appendix H

Japanese Beetle Notification List

The following individuals (or institutions) in the non-infested States must be notified of situations that threaten their JB-free status.

Arizona

Arizona Department of Agriculture
Cherry Chandler
(602) 542-0955
Fax: (602) 542-1004
or
Ahmed Nasser
(602) 542-3308
Fax: (602) 542-1004

USDA-APHIS
Carlos Bejarano, PPQ Officer
(602) 379-4028
Fax: (602) 379-6007

California

California Department of Agriculture
Aurelio Posadas
(916) 654-1211
Fax: (916) 654-0555

USDA-APHIS
Dan Hamon, Port Director
(916) 857-6258
Fax.: (916) 857-6266

Idaho

Idaho Department of Agriculture
Dr. Roger Vega
(208) 334-2986
Fax: (208) 334-2283

USDA-APHIS
Acting State Plant Health Director
(208) 733-5119
Fax: (208) 734-7863

Nevada

Nevada Department of Agriculture
Bob Gronowski
(775) 688-1180
Fax: (775) 688-1178

USDA-APHIS
Dan Kail, State Plant Health Director
(775) 784-5701
Fax: (775) 784-5468

Oregon

Oregon Department of Agriculture
Alan Mudge
(503) 986-4665
Fax: (503) 986-4786

USDA-APHIS
Mitch Nelson, State Plant Health Director
(503) 326-2814
Fax: (503) 326-2969

Utah

Utah Department of Agriculture
Ed Bianco, State Entomologist
(801) 538-7184
Fax: (801) 538-7189

USDA-APHIS
Robert King, State Plant Health Director
(801) 975-3310
Fax: (801) 975-3313

Washington

Washington State Department of Agriculture
Chad Phillips
(360) 586-8956
Fax: (360) 586-8509

USDA-APHIS
Linda Stark, Operations Support Officer
(206) 764-3182
Fax: (206) 764-3187

I

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Appendix I

Insecticide Information and Distributors

Disclaimer

This Appendix supplies additional information about the various insecticides used to control the JB stages. Mention of these products and companies is not to be considered an endorsement. These products and companies are mentioned merely as a convenience. Information on products and companies can be found at the following websites:

http://entweb.clemson.edu/pestticid/Document/Labels/individu.htm

http://www.greenbook.net/

http://www.extension.umn.edu/distribution/horticulture/DG7664.html

http://www.cdms.net

As a safety precaution, read and follow all label directions.

Besides label directions, follow all pertinent State and Federal laws.

Information on the distributors and their insecticides follows.

AgrEvo Evironmental Health

Larval Insecticides: Bendiocarb is the active ingredient in Ficam® W, a 76% Wettable Powder.

Bendiocarb was previously manufactured by AgrEvo for control of the JB adult in aircraft. AgrEVo was acquired by Bayer CropScience. The label was not renewed; however, the remaining stocks of Ficam® can still be used.

Bayer Advanced LLC

Bayer Advanced LLC
1500 Urban Center Drive
Birmingham, AL 35242

(877) 229-3725

Website: http://www.bayeradvanced.com

Larval Insecticides: Trichlorfon is the active ingredient in Bayer Advanced Lawn® 24-Hour Grub Control.

Imidacloprid is the active ingredient in Bayer Advanced Lawn® Season-Long Grub Control.

Comments: The trichlorfon in the 24-Hour Grub Control is labeled as giving "overnight results." Trichlorfon is an organophosphate with a high toxicity to birds and fish. Trichlorfon is **not** for use if there is a possibility that adjacent water will be exposed.

Imidacloprid in Bayer Advanced Lawn® Season-Long Grub Control is a chloronicotinyl with low toxicity to birds and fish.

Adult Insecticide: Cyfluthrin is the active ingredient in PowerForce™ Multi-insect Killer, which is labeled for Japanese beetles on flowers, trees, shrubs, and ground covers.

Comments: Cyfluthrin is a pyrethroid insecticide with a high toxicity to bees and fish. Cyfluthrin is **not** for use if there is a possibility that adjacent water will be exposed.

Bayer CropScience

Bayer CropScience LP
P. O. Box 12014, 2 T. W. Alexander Drive
Research Triangle Park, NC 27709

(866) 992-2937

Website: http://www.bayercropscienceus.com/products/index.html

Adult Insecticides: Carbaryl is the active ingredient in several formulations: (1) Sevin® XLR contains carbaryl as a microfine suspension in a aqueous medium, (2) Sevin® 80WSP is a dry powder formulation in water soluble packs, and (3) Sevin® 50W is also a dry powder for dispersion in water.

Cyfluthrin is the active ingredient in Renounce® 20WP. In this formulation, cyfluthrin can be used as a spray treatment for tree and vine crops.

Comments: Sevin® is probably the insecticide most commonly used to control Japanese beetle. Sevin® XLR is labeled for the control of Japanese beetle on pome fruits. Sevin® 80WSP is labeled for the control of Japanese beetle on tree fruit crops and forested areas. According to Judd (1982; *Insect. and Acar. Tests* 7:39), Sevin® 50W at the rate of 1.0 lb per 100 gallons of spray was effective on Japanese beetle on grape. According to Lawrence and coworkers (1973; *J. Econ. Entomol.* 66:477-479), carbaryl is very effective; if rainfall does **not** occur or if light showers occur, the protective action will last at least seven days.

Bayer Environmental Science

Bayer Environmental Science
95 Chestnut Ridge Road
Montvale, NJ 07645

1-800-331-2867

Website: http://www.bayerprocentral.com

Larval Insecticides: Imidacloprid is the active ingredient in several Merit® formulations

Comments: Imidacloprid is a chloronicotinyl with low toxicity to birds and fish.

Adult Insecticide: Imidacloprid is the active ingredient in several Merit® formulations, which are labeled for Japanese beetles on flowers, trees, shrubs, and ground covers.

Dow AgroSciences

Dow AgroSciences
P. O. Box 681428
9330 Zionsville Road
Indianapolis, IN 46268-1189

(800) 255-3726
(317) 337-3000

Website: http://www.dowagro.com/label/product_select.asp

Larval Insecticide: Chlorpyrifos is the active ingredient in Dursban™ 50W, a wettable powder formulation used at the rate of 4 to 8 lb/a for turf.

Comments: According to Villani and coworkers (1988; *J. Econ. Entomol.* 81:785-788) chlorpyrifos, applied as Dursban™ 50% wettable powder at 1.5 lb/a, give effective control (91%) for JB grubs. According to Moore (1980; *Insect. and Acar. Tests* 5:197), Dursban™ 2E at 4.0 lb/a gave effective control (around 90%) one year and moderate control (69%) the next year.

As a root ball dip, see the following website:

http://www.aphis.usda.gov/npb/jbintro.html

In addition, the CPHST (Center for Plant Health Science and Technology) laboratory at Otis ANGB, MA states that a chlorpyrifos rate of 1 pound per 100 gallons is effective.

Drexel Chemical Company

Drexel Chemical Company
P. O. Box 13327
Memphis, TN 38113-0327

(901) 774-4370

Website: http://www.drexchem.com

Larval Insecticide: Carbaryl is the active ingredient in Carbaryl 80S.

Comments: Carbaryl 80S is labeled for the control of grubs, including JB larvae, in turfgrass at the rate of 10 lb per acre.

Adult Insecticide: Carbaryl is the active ingredient in Carbaryl 80S.

Comments: Carbaryl 80S is labeled for the control of JB adults on pome fruits, stone fruits, trees, and ornamentals.

FMC Specialty Products

FMC Speciality Products
1735 Market Street
Philadelphia, PA 19103

(800) 321-1362

Website: http://pestsolutions.fmc.com

Adult Insecticide: Bifenthrin is the active ingredient in Talstar® Lawn and Tree Flowable Insecticide/Miticide and in Onyx™ Insecticide.

Comments: With Talstar® Lawn and Tree Flowable Insecticide/ Miticide, there is an application rate for JB adults on lawns and an application rate for JB adults on ornamentals.

St. Gabriel Laboratories

St. Gabriel Laboratories
14540 John Marshall Highway
Gainesville, VA 20155-1605

(800) 801-0061
(703) 754-3823

Website: http://www.milkyspore.com

Larval Insecticide: *Bacillus popilliae* is the important biological agent present in Milky Spore.

Comments: As a selective biological insecticide which controls the grub stage of JB, only one application is needed for lasting control. However, months may elapse before control occurs.

Speer Products

Speer Products
4242 BF Goodrich Blvd.
Memphis, TN 38118

(901) 362-1950

Website: http://www.speerproducts.com

Adult Insecticide: The compound d-phenothrin is used for the control of adults on aircraft.

Comment: This compound is authorized for use on aircraft.

Syngenta Crop Protection, Inc.

Syngenta Professional Products
P. O. Box 18300
Greensboro, NC 27419

(800) 334-9481 x 2368

Website: http://www.syngentaprofessionalproducts.com

Larval Insecticide: Thiamethoxam is the active ingredient in Flagship™ 25WG.

Comments: Flagship™ 25WG controls white grubs, including JB larvae.

Adult Insecticide: Lambda-cyhalothrin is the active ingredient in several formulations, such as Scimitar® GC (for ornamentals, including trees, shrubs, flowers, foliage plants, and ground covers).

Comments: Scimitar® GC is a resticted use insecticide.

Uap-Loveland Products Incorporated

United Agri Products (UAP)
419 18th St.
Greeley, CO 80631

(970) 356-4400 (for information)

Website: http://www.uap.com/crop-frames.html

Larval Insecticide: Carbaryl is the active ingredient in Sevin® 5 Grandular.

Comments: Sevin® 5 Grandular controls white grubs, including JB larvae, at a rate of 3.8 lb per 1,000 ft^2.

(UAP also makes diazinon in various formulations. Because of its avian and aquatic toxicity, diazinon is a restricted use insecticide that must be handled by a Certified Applicator.)

Adult Insecticide: Carbaryl is the active ingredient in several formulations, such as Carbaryl 4L® (for tree fruit and nut crops.

Comments: Carbaryl, commonly used under the trade name Sevin®, is a carbamate insecticide.

Valent USA Corporation

Valent USA Corporation
133 N. California Blvd., Suite 600
Walnut Creek, CA 94596

(800) 89-VALENT
(925) 256-2700

Website: http://www.valent.com

Adult Insecticide: Acephate is the active ingredient in Orthene® Turf, Tree, Ornamental Spray and Orthene® Turf, Tree, Ornamental WSP, a water soluble powder.

Comments: Acephate is used to control the adult JB on trees, shrubs, and certain outdoor floral crops. According to Lawrence and coworkers (1973; *J. Econ. Entomol.* 66:477-479), activity will remain in spite of light rains.

J

Japanese Beetle Program Manual

Appendix J

Aircraft Information

Sources of Information

Several sources will supply information about aircraft:

1. The USDA-APHIS *Treatment Manual* also contains information on aircraft treatments (T409) and aircraft volumes. Similar information on aircraft volumes appears in the following section.
2. The latest edition of Air Force Regulation 161-71, paragraph 4, entitled *How to Disinfect Aircraft* contains information on requirements for aerosol disinfestation of U.S. Air Force aircraft.
3. The *Aircraft Volume Manual* may be found in each Regional Office.

Aircraft manufacturers will supply information about their aircraft:

Airbus Industries of North America, Inc.

593 Herndon Parkway
Herndon, VA 20170
(703) 834-3400
Fax: (703) 834-3550
Website: http://www.airbus.com/body.html

Boeing Commercial Aeroplane Group

P. O. Box 3707, Mail Stop 74-31
Seattle, WA 98124-2207
Telephone:(425) 237-3657
Website: http://www.boeing.com/commercial.com

Fairchild Dornier Corp.

P. O. Box 790490
San Antonio, TX 78279-0490
Telephone:(210) 824-2313
Website: http://www.faidor.com/

McDonald-Douglas Corporation

Military Aircraft Section
P. O. Box 516
St. Louis, MO 63166
(314) 233-5360
Fax:(314) 232-7528

Other Aircraft Manufacturers

Aerospatiale

Website: http://www.aerospatiale.fr/produits/avions

Casa

Website: http://www.casa.es

Aircraft Volumes

The information in the following table is similar to the information contained in Table 5.5.1 of the *Treatment Manual*. This table lists aircraft frequently encountered in program inspections.

The spray rate of 10% d-phenothrin is 5 gram/second; the aerosol cans are designed to deliver the aerosol at this rate.

The figures in the four columns on the right are:

(1) volume of aircraft compartment in cubic feet

(2) units in 1,000 cubic feet

(3) grams needed per 1,000 cubic feet - always 8

(4) the number of seconds to spray the aerosol

NOTICE

Because of aircraft modifications, actual volumes may vary from those within the table.

TABLE J-1: Airbus Industries

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
A300	Cabin	27,100	27.1	8	43.5
	Pit-#1	3,722	3.7	8	6.0
	Pit-#2	1,265	1.3	8	2.0
	Pit-#3	565	.6	8	1.0
A300-600R (passenger) (long-range)	Cabin	?			
	Forward	1,134	1.1	8	2.0
	Aft	1,134	1.1	8	2.0
	Bulk	400	.4	8	0.5
A300-600 (freighter)	Main	9,950	10.0	8	16.0
	Pit-Fwd	1,900	1.9	8	3.0
	Pit-Aft	2,250	2.2	8	3.5
A300-600 (FEDEX)	Main	19,069	19.1	8	30.5
	Pit-Fwd	2,684	2.7	8	4.5
	Pit-Aft	2,154	2.2	8	3.5
	Pit-Back	742	.7	8	1.0
A300 (convertible)	Main	11,943	11.9	8	19.0
A300B4 (freighter)	Main	9,950	10.0	8	16.0
	Pit-Fwd	1,900	1.9	8	3.0
	Pit-Aft	1,850	1.9	8	3.0
A310 (freighter)	Main	7,950	8.0	8	13.0
	Pit-Fwd	1,260	1.3	8	2.0
	Pit-Aft	1,550	1.6	8	2.5
A310 (FEDEX)	Main	14,650	14.7	8	23.5
	Pit-Fwd	1,942	1.9	8	3.0
	Pit-Aft	1,271	1.3	8	2.0
	Pit-Back	742	.7	8	1.0
A320-200 (passenger)	N/A	982	.9	8	1.5

TABLE J-2: Antonov

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
AN 124 and 126	N/A	26,485	26.5	8	42.5

TABLE J-3: ATR

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
ATR 42 (CTO) (Container Transport Option)	Bulk	890	.9	8	1.5
ATR 72 (CTO)	Bulk	1,285	1.3	8	2.0

TABLE J-4: BAC (British Aircraft Corp)

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
111-200, 300, and 400	Cabin	4,056	4.1	8	6.5
	Pit-Fwd	380	.4	8	0.5
	Pit-Aft	154	.2	8	0.5
111-500	Cabin	5,094	5.1	8	8.0
	Pit-Fwd	451	.5	8	1.0
	Pit-Aft	260	.3	8	0.5
VC 10	Cabin	6,750	6.8	8	11.0
	Pit-Fwd	744	.7	8	1.0
	Pit-Aft	820	.8	8	1.5
Super VC 10	Cabin	7,850	7.9	8	12.5
	Pit-Fwd	744	.7	8	1.0
	Pit-Aft	820	.8	8	1.5

TABLE J-5: BAC (Aerospatiale)

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Concorde	Cabin	5,100	5.1	8	8.0
	Pit-Fwd	241	.2	8	0.5
	Pit-Aft	468	.5	8	1.0

TABLE J-6: Boeing

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
707-120, 120B, and 220	Cabin	7,484	7.5	8	12.0
	Pit-Fwd	755	.8	8	1.5
	Pit-Aft	910	.9	8	1.5
	Fl.Deck	451	.5		1.0
707-320C	Bulk	7,548	7.5	8	12.0

TABLE J-6: Boeing (continued)

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
707-320, 420	Cabin	8,074	8.0	8	13.0
	Pit-Fwd	870	.9	8	1.5
	Pit-Aft	905	.9	8	1.5
	Fl. Deck	451	.5	8	1.0
720	Cabin	6,860	6.9	8	11.0
	Pit-Fwd	688	.7	8	1.0
	Pit-Aft	690	.7	8	1.0
	Fl. Deck	451	.5	8	1.0
727-100C	Bulk	4,168	4.2	8	7.0
727-100 (passenger)	Cabin	4,560	4.6	8	7.5
	Pit-Fwd	900	.9	8	1.5
	Pit-Aft	425	.4	8	0.5
	Fl. Deck	451	.5	8	1.0
727-200C	Bulk	8,032	8.0	8	13.0
727-200 (passenger)	Cabin	6,561	6.6	8	10.5
	Pit-Fwd	690	.7	8	1.0
	Pit-Aft	760	.8	8	1.5
	Fl. Deck	451	.5	8	1.0
	Lower Hold	875			
737-100	Cabin	4,636	4.6	8	7.5
	Pit-Fwd	370	.3	8	0.5
	Pit-Aft	505	.4	8	0.5
737-200 (passenger)	Cabin	4,636	4.6	8	7.5
	Pit-Fwd	370	.4	8	0.5
	Pit-Aft	505	.5	8	1.0
737-200C	Bulk	3,602	3.6	8	6.0
737-300	Cabin	4,900	5.6	8	8.0
	Pit-Fwd	425	.4	8	1.0
	Pit-Aft	650	.8	8	1.0
	Fl. Deck	225	.2	8	0.5
737-400	Cabin	5,600	5.6	8	9.0
	Pit-Fwd	600	.6	8	1.0
	Pit-Aft	770	.8	8	1.5
	Fl. Deck	225	.2	8	0.5
737-500	Cabin	4,340	4.3	8	7.0
	Pit-Fwd	290	.3	8	0.5
	Pit-Aft	535	.5	8	1.0
	Fl. Deck	255	.3	8	0.5
747 Combi	—	6,886	6.9	8	11.0
747F	—	22,952	23.0	8	37.0
747-100, 200	Cabin	27,650	27.7	8	44.5
	Pit-Fwd	3,485	3.5	8	6.0
	Pit-Aft	3,015	3.0	8	5.0
	Fl. Deck	920	.9	8	1.5
	U. Deck	1,370	1.4	8	2.0
	Belly	1,000	1.0	8	1.5

TABLE J-6: Boeing (continued)

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
747-300,400	Cabin	27,650	27.7	8	44.5
	Pit-Fwd	3,485	3.5	8	5.5
	Pit-Aft	3,015	3.0	8	5.0
	Fl. Deck	920	.9	8	1.5
	U. Deck	2,800	2.8	8	4.5
	Belly	1,000	1.0	8	1.5
757-200 (passenger)	Pit-Fwd	652	.6	8	1.0
	Pit-Aft	1,086	1.1	8	2.0
757-200PF	Bulk	8,405	8.4	8	13.5
767-200	Main	14,255	14.3	8	23.0
	Pit-Fwd	1,470	1.5	8	2.5
	Pit-Aft	1,470	1.5	8	2.5
767-300 (passenger)	Cabin	10,497	10.5	8	17.0
	Pit-Fwd	1,920	1.9	8	3.0
	Pit-Aft	1,680	1.7	8	2.5
	Aft+Bulk	430	.4	8	0.5
777-200	Cabin	20,700	20.7	8	33.0
	Pit-Fwd	280	.3	8	0.5
	Pit-Aft	4,630	4.6	8	7.5
	Aft+Bulk	4,220	4.2	8	6.5

TABLE J-7: Canadair

Aircraft, model, and series	Area	Volume ft_3	Aerosol Calculations 1,000 ft_3 Units	Grams/ 1,000 ft_3	Spray Time in Seconds
CL-44	Bulk	6,235	6.2	8	10.0
CL-440	Bulk	13,798	13.8	8	22.0

TABLE J-8: Casa

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
C-212	N/A	777	.8	8	1.5
ATR 72 (CTO)	N/A	1,528	1.5	8	2.5

TABLE J-9: Cessna

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Caravan	N/A	452	.5	8	1.0

TABLE J-10: Convair

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations		
			1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
240	Cabin	1,650	1.7	8	2.5
	Pit-Fwd	193	.2	8	0.5
	Belly	88	.1	8	—[1]
340 & 44-	Cabin	1,816	1.8	8	3.0
	Pit-Fwd	158	.2	8	0.5
	Pit-Aft	193	.2	8	0.5
	Belly	78	.1	8	—[1]
880 & 800M	Cabin	5,802	5.8	8	9.5
	Pit-Fwd	415	.4	8	0.5
	Pit-Aft	488	.5	8	1.0
990	Cabin	6,336	6.3	8	10.0
	Pit-Fwd	488	.5	8	1.0
	Pit-Aft	497	.5	8	1.0

1 In these small volume spaces, use the extender and calculate the application time using a rate of 2.5 grams per second. At a rate of 2.5 grams per second, the following table will give the spray time.

1,000 ft^3 Units	Spray Time in Seconds
.1	0.5
.2	0.5
.3	1.0
.4	1.5

TABLE J-11: de Havilland

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations		
			1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Dash 7, Series 100 (all cargo)	N/A	240	.2	8	0.5
DHC-6 Twin Otter, Series 300 (cargo version)	Fwd Aft Bulk	38 88 384	.1 .1 .4	8 8 8	___[1] ___[1] 0.5
Dash 7, Series 100, Combi (50 passengers)	N/A	240	.2	8	0.5
Dash 7, Series 100, Combi (18 passengers)	N/A	240	.2	8	0.5
Dash 8, Series 300, Combi (49 passengers)	N/A	400	.4	8	0.5
Dash 8, Series 100, Combi (37 passengers)	N/A	300	.3	8	0.5
Dash 8, Series 100, Combi (20 passengers)	N/A	775	.8	8	1.5

1 In these small volume spaces, use the extender and calculate the application time using a rate of 2.5 grams per second. At a rate of 2.5 grams per second, the following table will give the spray time.

1,000 ft^3 Units	Spray Time in Seconds
.0	0.5
.2	0.5
.3	1.0
.4	1.5

TABLE J-12: Dornier

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations		
			1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
228-212	N/A	642	.6	8	1.0

TABLE J-13: Embraer

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
EMB-120 Brasilia	N/A	1,193	1.2	8	2.0
EMB-110 Brasilia	N/A	523	.5	8	1.0

TABLE J-14: Fairchild

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Expediter	NA	580	.6	8	1.0
Metro II & IIA	NA	580	.6	8	1.0
F27	Cabin	2,900	2.9	8	4.5
	Pit	192	.2	8	0.5
FH11227	Cabin	3,200	3.2	8	5.0
	Pit	192	.2	8	0.5

TABLE J-15: Fokker

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
F27	N/A	198	.2	8	0.5
F28	N/A	290	.3	8	0.5
F100C	Bulk	2,070	2.0	8	3.0

TABLE J-16: Lockheed

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Electra	Cabin	5,160	5.2	8	8.5
	Pit-Fwd	254	.3	8	0.5
	Pit-Aft	274	.3	8	0.5
L1011	Cabin	23,100	23.1	8	37.0
(100)	Pit-Fwd	1,600	1.6	8	2.5
(200)	Pit-Ctr	1,600	1.6	8	2.5
(250)	Pit-Aft	700	.7	8	1.0
	Galley	1,380	1.4	8	2.0
L-1011-1	Cargo Holds	3,900	3.9	8	6.0
L-100-30	N/A	6,057	6.1	8	10.0

TABLE J-17: McDonnel-Douglas

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
DC-3	Bulk	1,300	1.3	8	2.0
DC-6 (cargo)	Bulk	3,354	3.4	8	5.5
DC-6 (passengers)	Cabin	4,332	4.3	8	7.0
	Pit-Fwd	200	.2	8	0.5
	Pit-Aft	173	.2	8	0.5
DC-6A	Cabin	4,375	4.4	8	7.0
	Pit-Fwd	267	.3	8	0.5
	Pit-Aft	300	.3	8	0.5
DC-6B	Cabin	4,375	4.4	8	7.0
	Pit-Fwd	276	.3	8	0.5
	Pit-Aft	242	.2	8	0.5
DC-7B	Cabin	4,612	4.6	8	7.0
	Pit-Fwd	267	.3	8	0.5
	Pit-Aft	364	.4	8	0.5
DC-7C	Cabin	4,778	4.8	8	7.5
	Pit-Fwd	312	.3	8	0.5
	Pit-Aft	339	.3	8	0.5
DC-8-50	Cabin	12,911	12.9	8	20.5
	Pit-Fwd	690	.7	8	1.0
	Pit-Aft	700	.7	8	1.0
DC-8-54F	Main	5,984	6.0	8	9.5
	Pit-Fwd	690	.7	8	1.0
	Pit-Aft	700	.7	8	1.0
DC-8-55F	Main	5,878	5.9	8	9.5
	Pit-Fwd	690	.7	8	1.0
	Pit-Aft	700	.7	8	1.0
DC-8-61 & 63	Cabin	15,955	16.0	8	25.5
	Pit-Fwd	1,290	1.3	8	2.0
	Pit-Aft	1,210	1.2	8	2.0
DC-8-62	Cabin	13,739	13.7	8	22.0
	Pit-Fwd	799	.8	8	1.5
	Pit-Aft	816	.8	8	1.5
DC-8-62CF	Main	6,442	6.4	8	10.0
	Pit-Fwd	800	.8	8	1.5
	Pit-Aft	815	.8	8	1.5
DC-8-63F and DC-8-73F	Main	10,350	10.4	8	16.5
	Pit-Fwd	1,290	1.3	8	2.0
	Pit-Aft	1,210	1.2	8	2.0
DC-8-71CF	Main	8,148	8.1	8	13.0
	Pit-Fwd	1,290	1.3	8	2.0
	Pit-Aft	1,210	1.2	8	2.0
DC-8-61CF & 71CF	Main	15,472	15.5	8	25.0
	Pit-Fwd	1,290	1.3	8	2.0
	Pit-Aft	1,210	1.2	8	2.0

TABLE J-17: McDonnel-Douglas (continued)

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
DC-9-10	Cabin	4,056	4.1	8	6.5
	Pit-Fwd	1,000	1.0	8	1.5
	Pit-Aft	619	0.6	8	1.0
DC-9-10AF	Main	2,386	2.4	8	4.0
	Pit-Fwd	373	.4	8	0.5
	Pit-Aft	327	.3	8	0.5
DC-9-30	Cabin	5,094	5.1	8	8.0
	Pit-Fwd	1,386	1.4	8	2.0
	Pit-Aft	832	.8	8	1.5
DC-9-32AF	Main	3,300	3.3	8	5.5
	Pit-Fwd	562	.6	8	1.0
	Pit-Aft	333	.3	8	0.5
DC-9-33CF	Main	2,944	2.9	8	4.5
	Pit-Fwd	562	.6	8	1.0
	Pit-Aft	333	.3	8	0.5
DC-40	Cabin	5,535	5.5	8	9.0
	Pit-Fwd	1,290	1.3	8	2.0
	Pit-Aft	1.040	1.0	8	1.5
DC-10-10CF & 10F, also DC-10-30CF & 30F	Main	12,236	12.2	8	19.5
	Pit-Fwd	3,020	3.0	8	5.0
	Pit-Ctr	1,935	1.9	8	3.0
	Pit-Aft	510	.5	8	1.0
	Fl. Deck	400	.4	8	0.5
MD 8-61/63	Main	11,173	11.2	8	18.0
	Pit-Fwd	1,290	1.3	8	2.0
	Pit-Aft	1,210	1.2	8	2.0
MD8-62	Main	8,862	8.9	8	14.0
	Pit-Fwd	800	.8	8	1.5
	Pit-Aft	815	.8	8	1.5
MD9-10	Main	3,582	3.6	8	6.0
	Pit-Fwd	393	.4	8	0.5
	Pit-Aft	254	.3	8	0.5
MD9-30	Main	4,525	4.5	8	7.0
	Pit-Fwd	562	.6	8	1.0
	Pit-Aft	333	.3	8	0.5
MD9-40	Main	4,926	4.9	8	8.0
	Pit-Fwd	618	.6	8	1.0
	Pit-Aft	350	.4	8	0.5
MD-11F	Main Deck	15,530	15.5	8	25.0
	Lower Deck	4,976	5.0	8	8.0
MD-11 Combi	Main	5,822	5.8	8	9.5
	Pit-Fwd	3,655	3.7	8	6.0
	Pit-Ctr	2,685	2.7	8	4.5
	Pit-Aft	510	.5		1.0
MD-80 JT8D-217C	Lower Hold	1,253	1.3	8	2.0

TABLE J-17: McDonnel-Douglas (continued)

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
MD-80 JT8D-219	Lower Hold	1,013	1.0	8	1.5
MD 81 & 82	Cargo	1,253	1.3	8	2.0
MD-83	Cargo	1,013	1.0	8	1.5
MD-87	Cargo	938 or 697	.9 .7	8 8	1.5 1.0
MD-88	Cargo	1,013 or 1,253	1.0 1.3	8 8	1.5 2.0

TABLE J-18: SAAB

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
340 B/QC	N/A	1,303	1.3	8	2.0

TABLE J-19: Shorts

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
330	N/A	1,230	1.2	8	2.0
360 and 360-F	N/A	1,450	1.5	8	2.5

TABLE J-20: Sidely

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Carvelle	Cabin Pit-Fwd Pit-Aft	5,600 258 116	5.6 .3 .1	8 8 8	9.0 0.5 —[1]

1 In these small volume spaces, use the extender and calculate the application time using a rate of 2.5 grams per second. At a rate of 2.5 grams per second, the following table will give the spray time.

1,000 ft^3 Units	Spray Time in Seconds
.1	0.5
.2	0.5
.3	1.0
.4	1.5

TABLE J-21: Tupolev

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
TU-154	Bulk	5,000	5.0	8	8.0

TABLE J-22: Vickers

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
Merchantman	Bulk	5,040	5.0	8	8.0
Viscount	Bulk	3,000	3.0	8	5.0

TABLE J-23: Military Aircraft

Aircraft, model, and series	Area	Volume ft^3	Aerosol Calculations 1,000 ft^3 Units	Grams/ 1,000 ft^3	Spray Time in Seconds
C-5A	Main	46,651	46.7	8	74.5
	U. Deck	6,147	6.1	8	10.0
	Fwd. &			8	
	Fl. Deck	5,147	5.1	8	8.0
	U. Floor	6,294	6.3	8	10.0
C-17	Main	20,875	20.9	8	33.5
C-26	Cabin	500	.5	8	1.0
	Pit	198	.2	8	0.5
C-130	Main	8,340	8.3	8	13.5
C-130 LG382		4,737	4.7	8	7.5
C-130 LG385-G		6,057	6.1	8	10.0
C-135	Cabin	6,000	6.0	8	9.5
C-141	Main	12,000	12.0	8	19.0
C-141B	Main	13,701	13.7	8	22.0
KC-10	Cabin	4,056	4.1	8	6.5
	Pit-Fwd	1,000	1.0	8	1.5
	Pit-Aft	619	.6	8	1.0

K

Japanese Beetle Program Manual

Appendix K

PPQ Form 250
Aircraft Clearance or Safeguard Order

Use of PPQ Form 250

If requested by personnel at a destination airport, issue an Aircraft Clearance or Safeguard Order (PPQ Form 250) to the pilot after treating an aircraft. However, if personnel do not request a PPQ Form 250, do not issue this document.

The following page shows a sample PPQ Form 250, Aircraft Clearance or Safeguard Order.

FORM APPROVED - OMB NO 0579-0094

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

AIRCRAFT CLEARANCE OR SAFEGUARD ORDER

1. AIRCRAFT NO.
2. TRIP/FLIGHT NO.
3. NAME OF CARRIER
4. Foreign port (Prior clearance)
5. PLACE OF DEPARTURE (U.S.)
6. Military ports (or air base U.S.)

THE ABOVE AIRCRAFT HAS BEEN INSPECTED AND -

7. ☐ **COMPLETELY CLEARED** (Including all baggage, personal effects, stores, garbage, and cargo.)

8. ☐ **PARTIALLY CLEARED** (Exceptions and safeguard conditions noted in Item 11 below.)

9. SIGNATURE OF PLANT PROTECTION AND QUARANTINE OFFICER
10. DATE

11. EXCEPTIONS AND SAFEGUARD CONDITIONS

14. FINAL DISPOSITION ACTION

15. SIGNATURE OF PLANT PROTECTION AND QUARANTINE OFFICER
16. DATE

AFTER FINAL DISPOSITION ACTION RETURN TO:

17. NAME AND ADDRESS OF ORIGINATING OFFICE

I agree to see that the conditions in Item 11 are carried out.

12. SIGNATURE OF AIRCRAFT COMMANDER
13. DATE

PPQ FORM 250 (NOV 91) *(Previous editions may be used.)*

*U.S. Government Printing Office: 1991-306-044/50019

FIGURE 1-1: PPQ Form 250

L

Japanese Beetle Program Manual

Appendix L

JB Aircraft Inspection Record

Japanese Beetle Aircraft Inspection Record (JBAIR)

The Japanese Beetle Aircraft Inspection Record (JBAIR) is a the form used at receiving airports to document the interception of Japanese beetles on arriving flights.

The following page contains a copy of the Japanese Beetle Aircraft Inspection Record.

Japanese Beetle Aircraft Inspection Record

Date: _____
Airport: _____
Carrier: _____
Flight No.: _____
Origin: _____
Route: _____
Regulated at origin? o Yes o No
Tail No.: N_____
Aircraft Type: _____

Arrival Time: _____
Time of Inspection: From: _____ To: _____
Inspectors: _____
PDR/309# _____
Treated at destination? o Yes o No
EAN issued? (attach copy) o Yes o No
Notice of violation issued? o Yes o No
Applicators: _____

Indicate location and condition of beetles found and total for each category:

	Cockpit	Cabin, Galley or Toilet (circle one)	Main Cargo Door Sill	Ball Mat or Vicinity	Main Cargo Area	Belly Hold (front)	Belly Hold (rear)	Other (specify)	Other (specify)	TOTAL:	No. Morb. Held:
DEAD (Dried):											
DEAD (Fresh):											
MORIBUND:											
ALIVE:											
TOTAL:											

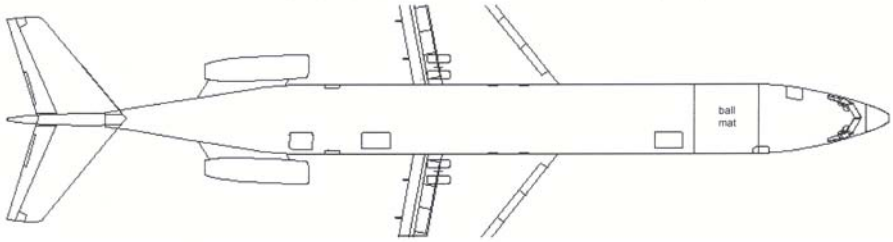
DEAD-dried (DD): No independent movement or response when stimulated. Dried out, appendages brittle. Beetle may be whole, broken or fragmented.

DEAD-fresh (DF): Same as above except appendages flexible, not brittle. Note: beetles may just be "playing" dead or cold. If motionless, allow beetles to warm up in hand or place in a vial in pocket for 20-30 seconds before evaluating.

MORIBUND (M): In advanced stages of dying. Capable of only minimal uncoordinated movement of appendages e.g. legs or antennae twitching, often on back and unable to right themselves. Incapable of coordinated movement (e.g. walking more than one body length) when warm. Incapable of feeding if held for observation.

ALIVE (A): Alert and active. Capable of coordinated movement when warm e.g. righting themselves if on back, walking at least one body length, responding to stimuli, struggling to escape, capable of feeding if allowed etc. Antennae out and open.

Indicate number, location and condition (DD, DF, M, A) of beetles found on the following diagram:



Please note specific locations of beetles found, additional comments, notes etc. (use back if necessary). Observation Results:

_____
_____
_____
_____

Hours	Alive	Dead	Morb.
12			
24			
48			

Rev. 6/6/03

FIGURE L-2: The Japanese Beetle Aircraft Inspection Recordt (JBAIR)

M

Japanese Beetle Program Manual

Appendix M

Airport Histories: Regulated and Deregulated Due to JB

Regulated Airports in 2003

TABLE M-1: Regulated Airports in 2003

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Wilmington, OH	Airborne Express	28Jun03 08:00 hrs	06Sep03 08:00 hrs
Indianapolis, IN	Federal Express	01Jul03 08:00 hrs	26Aug03 08:00 hrs
Nashville, TN	South West American Airlines	18Jul03 14:30 hrs	20Aug03 09:00 hrs
Rickenbacker LCK, OH	Military	28Jul03 15:30 hrs	20Aug03 08:00 hrs
Bentonville, AR	American Airlines	05Aug03 09:00 hrs	20Aug03 15:00 hrs
Martinsburg, WV	WV Air National Guard	05Aug03 14:30 hrs	24Sep03 11:30 hrs

Regulated Airports in 2002

TABLE M-2: Regulated Airports in 2002

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Dover AFB, DE	Military	22Jun02 08:00 hrs	09Aug02 ?00:00 hrs
Indianapolis, IN	Federal Express	23Jun02 08:00 hrs	04Sep02 ?00:00 hrs
Wilmington, OH	Airborne Express	30Jun02 11:00 hrs	06Sep02 ?00:00 hrs
Eastern WV Regional Airport Martinsburg, WV	Shepard Field ANG	01Jul02 13:00 hrs	28Aug02 ?00:00 hrs
Rickenbacker ANG, OH	Military	03Jul02 13:00 hrs	29Aug02 ?00:00 hrs

Regulated Airports in 2001

TABLE M-3: Regulated Airports in 2001

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Wilmington, OH	Airborne Express	26Jun01 11:00 hrs	24Aug01 15:30 hrs
Indianapolis, IN	U. S. Postal Service	26Jun01 08:00 hrs	07Sep01 08:00 hrs
	Federal Express	27Jun01 08:00 hrs	07Sep01 08:00 hrs
Dover AFB, DE	Military	03Jul01 08:00 hrs	24Aug01 19:00 hrs
Rickenbacker ANG, OH	Military	05Jul01 12:00 hrs	29Aug01 11:30 hrs
Eastern WV Regional Airport Martinsburg, WV	Military (WV Air National Guard?)	06Jul01 12:00 hrs	11Sep01 16:00 hrs
Wright Patterson AFB, OH	Military	09Jul01 08:30 hrs	24Aug01 15:30 hrs

Regulated Airports in 2000

TABLE M-4: Regulated Airports in 2000

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Indianapolis, IN	U. S. Postal Service	27Jun00 08:00 hrs	05Sep00 08:00 hrs
	Federal Express	28Jun00 12:00 hrs	05Sep00 08:00 hrs
Dover AFB, DE	Military	06Jul00 08:00 hrs	25Aug00 17:00 hrs
Wilmington, OH	Airborne Express	12Jul00 09:00 hrs	25Aug00 11:00 hrs
Rickenbacker ANG, OH	Military	14Jul00 16:30 hrs	24Aug00 15:45 hrs

Regulated Airports in 1999

TABLE M-5: Regulated Airports in 1999

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Indianapolis, IN	Federal Express	29Jun99 08:00 hrs	20Aug99 08:00 hrs
	U. S. Postal Service	01Jul99 10:00 hrs	20Aug99 08:00hrs
Rickenbacker ANG, OH	Air National Guard	30Jun99 08:00 hrs	11Aug99 16:40 hrs
Dover AFB, DE	Military	06Jul99 10:00 hrs	23Aug99 12:00 hrs
Wilmington, OH	Airborne Express	13Jul99 13:30 hrs	17Aug99 14:20 hrs

Regulated Airports in 1998

TABLE M-6: Regulated Airports in 1998

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Dover AFB, DE	Military	23Jun98 08:00 hrs	21Aug98 20:00 hrs
Indianapolis, IN	Federal Express UPS Facility	24Jun98 08:00 hrs 15Jul98 08:00 hrs	20Aug98 08:00 hrs 20Aug98 08:00 hrs
Eastern WV Regional Airport Martinsburg, WV	WV Air National Guard	28Jun98 12:00 hrs	20Aug98 16:00 hrs
Rickenbacker ANG, OH	Military	07Jul98 08:00 hrs	19Aug98 16:30 hrs
McGuire AFB, NJ	Military	13Jul98 13:00 hrs	18Aug98 08:00 hrs

Regulated Airports in 1997

TABLE M-7: Regulated Airports in 1997

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Indianapolis, IN	Federal Express	03Jul97 10:00 hrs	22Sep97 10:00 hrs
Dover AFB, DE	Military	08Jul97 08:00 hrs	03Sep97 08:00 hrs
McGuire AFB, NJ	Military	11Jul97 08:00 hrs	15Aug97 08:00 hrs
Eastern WV Regional Airport Martinsburg, WV	Military WV Air National Guard	11Jul97 12:00 hrs	15Aug97 08:00 hrs
Rickenbacker ANG, OH	Military	15Jul97 12:30 hrs	15Sep97 16:00 hrs
Wilmington, OH	Airborne Express	29Jul97 12:00 hrs	26Aug97 14:30 hrs
Wright Patterson AFB, OH	Military	04Aug97 15:00 hrs	22Aug97 14:00 hrs

Regulated Airports in 1996

TABLE M-8: Regulated Airports in 1996

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Rickenbacker ANG, OH	Military	11Jul96 12:00 hrs	27Aug96 14:15 hrs
Indianapolis, IN	Federal Express	12Jul96 10:00 hrs	04Sep96 08:00 hrs
McGuire AFB, DE	Military	17Jul96 13:00 hrs	14Aug96 08:00 hrs
Wilmington, OH	Airborne Express	02Aug96 13:00 hrs	04Sep96 13:00 hrs
Wright-Patterson AFB, OH	Military	16Aug96 14:00 hrs	03Sep96 15:40 hrs

Regulated Airports in 1995

TABLE M-9: Regulated Airports in 1995

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Indianapolis, IN	Federal Express (?)	28Jun95 10:00 hrs	29Aug95 08:00 hrs
Dover AFB, DE	Military	29Jun95 08:00 hrs	03Aug95 15:00 hrs
Standiford Field, Louisville, KY (?)	Military (?)	30Jun95 12:00 hrs	11Aug95 17:00 hrs
Rickenbacker ANG, OH	Military	11Jul95 16:00 hrs	22Aug95 14:00 hrs
Wright-Patterson AFB, OH	Military	13Jul95 13:25 hrs	24Aug95 13:50 hrs
McGuire AFB, NJ	Military	14Jul95 13:00 hrs	10Aug95 08:00 hrs

Regulated Airports in 1994

TABLE M-10: Regulated Airports in 1994

LOCATION	CARRIER	DATE OF REGULATION	DATE OF DEREGULATION
Standiford Field, Louisville, KY (?)		21Jun94 08:00 hrs	15Aug94 08:00 hrs
Rickenbacker ANG, OH	Military	05Jul94 15:00 hrs	30Aug94 16:00 hrs
Dover AFB, DE	Military (?)	08Jul94 08:00 hrs	05Aug94 20:00 hrs
McGuire AFB, NJ	Military	11Jul94 08:30 hrs	29Jul94 14:00 hrs
Philadelphia Intl., PA		25Jul94 08:00 hrs	17Aug94 08:00 hrs
Wright-Patterson AFB, OH	Military	03Aug94 12:00 hrs	09Sep94 11:30 hrs

N

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Appendix N

Glossary

Aircraft Clearance or Safeguard Order (PPQ Form 250)

An Aircraft Clearance or Safeguard Order (PPQ Form 250) is the document issued to the pilot after inspection and, possibly, treatment of an aircraft. Usually, this document is issued when requested by a destination airport in the JB-free zone. If personnel at the destination airport do *not* request a PPQ Form 250, the document is *not* issued.

Appendix K shows a sample PPQ Form 250, Aircraft Clearance or Safeguard Order.

Aircraft-operating Areas

Aircraft-operating areas are those areas of an airport in which one or more of the following activities occur:

- Passenger boarding
- Luggage handling
- Cargo handling

Animal and Plant Health Inspection Service (APHIS)

The Animal and Plant Health Inspection Service (APHIS) is an agency within the United States Department of Agriculture (USDA). The mission of APHIS is to protect the animal and plant resources of the United States. Plant Protection and Quarantine (PPQ) is a unit within APHIS.

Authorized Inspector

Authorized Inspectors can be (1) any employee of APHIS or (2) any individual authorized by the Administrator of APHIS to enforce the JB quarantine.

Best Practices Guidelines

Developed by Federal, State, and industry personnel working in cooperation, the *Best Practices Guideline* discusses the methods and procedures that exclude or remove Japanese beetles from aircraft. The *Best Practices Guidelines* serves as a supplement to the *Japanese Beetle Program Manual* and does not supersede the *Japanese Beetle Program Manual*.

Compliance Agreement (CA)

A Compliance Agreement (CA) is a written agreement between APHIS and an individual in a business engaged in growing, handling, or moving regulated articles. In regard to transport of the Japanese beetle by aircraft, Compliance Agreements are issued (1) to monitor airports in the JB-free areas that receive at-risk flights and (2) to determine the risk at airports that are have an established Japanese beetle population.

Exclusion Devices

Exclusion devices, often called excluders, are designed to prevent or reduce the entry of JBs into aircraft during loading, unloading, and maintenance. A critical component of any JB management program, exclusion devices will vary in size based on local environmental factors and facilities. An exclusion device may be simple, such as netting (cloth or screen) covering the opening of an aircraft, or complex, such as a framed or covered structure.

High-risk Aircraft

High-risk aircraft are those aircraft scheduled to fly to JB-free areas after probable exposure to infestation by the Japanese beetle or carrying cargo probably exposed to infestation. Because high-risk aircraft are likely be infested, they are regarded as regulated articles.

Infested State

Infested States are those States in which surveys have found that the Japanese beetle is established throughout the State or in a portion of the State.

Japanese Beetle Aircraft Inspection Record (JBAIR)

The Japanese Beetle Aircraft Inspection Record (JBAIR) is a the form used by receiving airports to document the interception of Japanese beetles on arriving flights.

Appendix L contains a copy of the Japanese Beetle Aircraft Inspection Record.

JB-free Area

A JB-free area is an area in which the Japanese beetle is not established. All of the Protected States are JB-free. (Note that there are JB-free areas that are not in the Protected States.)

NAPIS Database

The National Agricultural Pest Information System (NAPIS) is the information-handling system developed to handle data on endemic and exotic pests from regulatory officials and scientists in the State departments of agriculture, scientists from land-grant universities, and regulatory officials in APHIS. Located at Purdue University (West Lafayette, IN), the NAPIS database contains information on the Japanese beetles, one of many introduced pests tracked by the database. Selected information in the NAPIS database can be used to produce current distribution maps for the Japanese beetle.

Non-regulated Airports

Non-regulated airports are those airports in the JB-infested area under quarantine where the Japanese beetle is *not* likely to enter aircraft and be transported to the Protected States (and other JB-free areas).

Peak Flight Period

The peak flight period is the time in which the Japanese beetle adults are most likely to be flying.

Plant Protection and Quarantine (PPQ)

Plant Protection and Quarantine (PPQ) is the unit within the Animal and Plant Health Inspection Service (APHIS) responsible for preventing the spread of significant plant pests.

Protected States

Protected States are the western States that are free of the Japanese beetle: Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Washington. In cooperation with APHIS and using the authorization in the *Code of Federal Regulations* (7 CFR 301.48), these nine Protected States are taking action so that they can remain free of the Japanese beetle.

Regulated Airport

Regulated airports are those airports, in the JB-infested area under quarantine, where the Japanese beetle is likely to enter aircraft and be transported to JB-free areas; because of the threat to JB-free areas, these airports are "regulated" in that they must adopt certain practices to protect the JB-free areas.

Regulated Articles

Because of the possibility of transport by aircraft, aircraft that are at or from regulated airports are considered to be regulated articles.

State Plant Health Director (SPHD)

In each State, the State Plant Health Director (SPHD) is the APHIS-PPQ employee who has overall responsibility for Federal programs that deal with exotic and endemic pests. The State Plant Health Director will work closely with personnel in the State department of Agriculture. The program to prevent the spread of the Japanese beetle is among the programs that the State Plant Health Directors manages or helps to manage.

State Plant Regulatory Official (SPRO)

The State Plant Regulatory Official (SPRO) is the authorized State official who is responsible for the operation of the State plant regulatory program.

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