

Section I
Surveys of Invasive and Emerging Pests

**RELATIONSHIP BETWEEN AIR CARGO INTERCEPTIONS AND
TRAP CATCHES OF JAPANESE BEETLE AT PDX**

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Due to positive catches in the immediate vicinity at Portland International Airport in the area where air cargo planes arrive and exchange cargo pallets since the early 1990s the ODA has focused its energy on surveying for and eradicating Japanese beetle coming in on aircraft.

Due to our aggressive eradication program, we assume that we have reintroductions of Japanese beetle via air cargo on an annual basis. Analysis of trap catches of Japanese beetle, interceptions of dead, moribund, and live Japanese beetle on air cargo plane inspections, and seasonal wind patterns gives us a fairly clear picture of introduction and population spread characteristics in our particular micro-region.

Oregon Department of Agriculture insect survey technicians or entomologists attempt to thoroughly inspect every air cargo flight coming to Portland International Airport from regulated airports in the east (as well as high risk flights from non-regulated airports like Louisville, Kentucky).

Japanese beetle's peak diurnal flight period is at peak temperature of the day. In the east this occurs between 11 am and 1 pm, the precise time when air cargo planes bound for western states are being loaded. In the West peak diurnal temperature occurs between 4 and 6 pm, the precise time that air cargo planes from quarantined states arrive in Portland and off-load their cargo. The typical tarmac conditions at off-load time is a constant 10 to 15 mile per hour wind coming out of the west.

At Portland International Airport Japanese beetles are impeded from establishing a population by many non-irrigated, sandy areas inhospitable to Japanese beetles. Japanese beetles are not, according to our trap catch data, attracted to the tall, non-irrigated grasses immediately surrounding the tarmac at the airport. Unfortunately east of the cargo area of Portland International Airport, beyond the Air National Guard air base, which has little or no irrigated areas, is Colwood golf course, which has hosted burgeoning populations of Japanese beetles at least twice in recent years. Japanese beetles are particularly attracted to frequently mowed, daily-irrigated grounds of golf courses.

Portland International Airport and the Port of Portland have been very cooperative in supporting our eradication efforts. Adjusting vegetation in coordination with spray projects can help reduce the likelihood of future introductions of Japanese beetles taking hold around airports.

Here we would like to draw some inferences between the data of the interceptions of dead, moribund, and live Japanese beetles on air cargo flight inspections and trap catches in our delimitation at PDX. Alan Mudge, the entomologist who oversaw the ODA JB program at PDX for 20 years, has made some graphs expressing the data collected over this period. He has generously allowed us to use them. The first graph shows the total numbers of beetles and their condition that we intercepted on airplane inspections over an eighteen-year period of time. What it does not show is the relative number graphically from year to year. Such a graph would indicate that in the two years that we intercept large numbers of beetles we also catch large numbers in our traps. The subsequent graphs break down the interceptions by carrier. At PDX the main cargo carriers perform their activities on the west side of the length of Airtrans Way. Roughly starting at the north end of the road you have UPS, then DHL off of Courier Court, and then FedEx, which is actually accessed around the corner from Airtrans Way on Cornfoot Road. They are all in the same basic area, but trap catch locations does seem to indicate a close relationship between where we find beetles on aircraft and then where we find them in traps.

In the early 1990s we were intercepting large numbers of beetles on UPS flights directly from their sorting hub in Louisville, Kentucky. In 1993 alone we intercepted 132 Japanese beetles during inspections of UPS planes. The previous year we had trapped a single JB right at

the UPS facility itself, but in 1993 we did not catch any. 1994 we trapped beetles south of the airport and in the ANG base east of Airtrans way, that could have easily come from the UPS area. It is not until later years that more interesting data emerges.

Once the UPS operation back in Louisville got a handle on their exclusion protocols and the population of beetles waned a bit numbers of interceptions on UPS decreased and FedEx flights from Indianapolis became the hot spot. In 2002 we intercepted 113 Japanese beetles on FedEx flights. That year we caught 11 Japanese beetles in traps around the FedEx facility at the south end of Airtrans Way. The following year we caught four beetles in traps right outside the FedEx facility. What seems to be the case is that the 2002 catches are likely beetles coming directly off the planes or the cans once they move into the sorting area. The 2003 catches are more likely beetles emerging from Portland soil that had been oviposited the previous season by beetles that did not get in our traps. The development of the stable isotope study may be able to verify this hypothesis.

In 2006 DHL became the locus of JB activity on planes. After intercepting only two beetles in three years of inspections from 2003 through 2005, in 2006 we intercepted 55 beetles. That season we trapped beetles either directly at the DHL facility, both on the tarmac and in front of the building, or at some distance from the facility that could be associated with the DHL flights. We did not trap any that year in the immediate vicinity of either the UPS or FedEx facilities. The following year, though the number of interceptions dropped significantly, the trap catches jumped from 6 to 13, most of them clustered in front of the DHL facility, probably associated with the breeding population there that was introduced the previous season.

Interestingly, to conclude, we come full circle back to UPS. In 2006 and 2007 we did not intercept a single JB on a UPS flight, nor did we catch any beetles at the north end of Airtrans Way associated with the UPS facility. In 2008 we intercepted a few JB's on UPS flights, including a live beetle. That same season we trapped a single JB right outside the UPS facility for the first time in several years. In 2009 the only beetles intercepted were on UPS flights, though the majority of our inspections take place at FedEx, who sent us no beetles in 2009. This summer the only beetles trapped at PDX were three surrounding the UPS facility.

When you overlay several years' worth of positive traps over an aerial photo of PDX, it becomes clear that the beetles are arriving on the cargo planes. Last year we spent \$70,000 eradicating the infestation next door at Colwood Golf Course, and \$97,000 at the Airtrans Center. This is not a sustainable situation. We're talking with the air carriers and they are listening, but we haven't found an answer yet.