

# Pest Risk Assessment for the State of Oregon

## *Trogoderma granarium* (Everts) - Khapra Beetle

### Pest Identity

**Scientific Name:** *Trogoderma granarium* (Everts)  
**Order:** Coleoptera  
**Family:** Dermestidae  
**Common Name:** Khapra Beetle

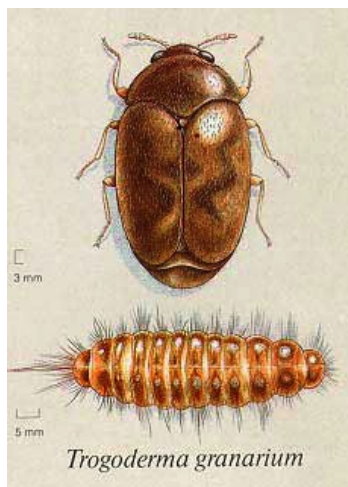
### Risk Rating Summary

**Relative Risk Rating:** High  
**Numerical Score:** 13 (maximum 20)  
**Uncertainty:** Low

### Pest Background

The Khapra beetle, *Trogoderma granarium* (Coleoptera, Dermestidae) is considered to be one of the most serious pests of stored grain products, various leguminous crops, rice, oat, barley, and rye in the world (Lowe et al., 2000). Its likely origin is India but it has since spread to Africa, parts of Europe, South America, and eastern Asia (Lindgren et al., 1955; Harris, 2009). It has been intercepted several times in ports of the United States of America but presently there are no known established populations in the US (French and Venette, 2005; Stibick, 2007; Harris, 2009).

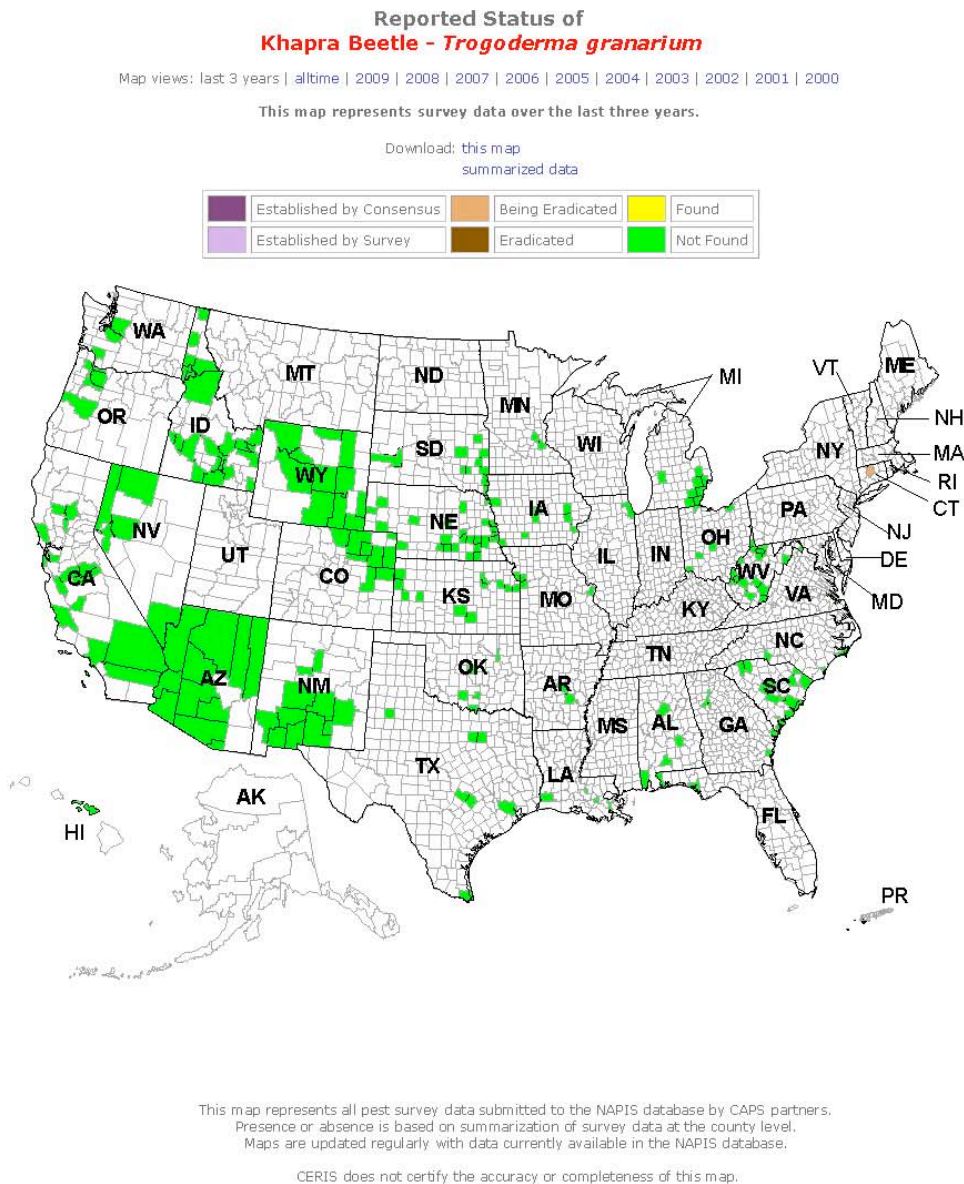
Although repeatedly introduced, an incipient infestation of the Khapra beetle was recorded in Tulare County, California in December 1953 attacking barley stored in warehouses (Lindgren et al., 1954). In 1954 the Khapra beetle subsequently was reported from several other counties in Arizona, California, Connecticut, Maryland, Michigan, New Jersey, New Mexico, New York, Oregon, Pennsylvania, and Texas from where it was consequently eradicated (Lindgren et al., 1954; Anonymous, 2006; Harris, 2009).



**Figure 1.** *Trogoderma granarium*: line drawings of adult and larvae (left); and larvae

and adults feeding on stored grain (right).

[Images from [http://www.biopuglia.iamb.it/erbacee/images/trogoderma\\_granarium.JPG](http://www.biopuglia.iamb.it/erbacee/images/trogoderma_granarium.JPG) (left); [http://www.eppo.org/QUARANTINE/insects/Trogoderma\\_granarium/TROGGA\\_images.htm](http://www.eppo.org/QUARANTINE/insects/Trogoderma_granarium/TROGGA_images.htm) (right)]



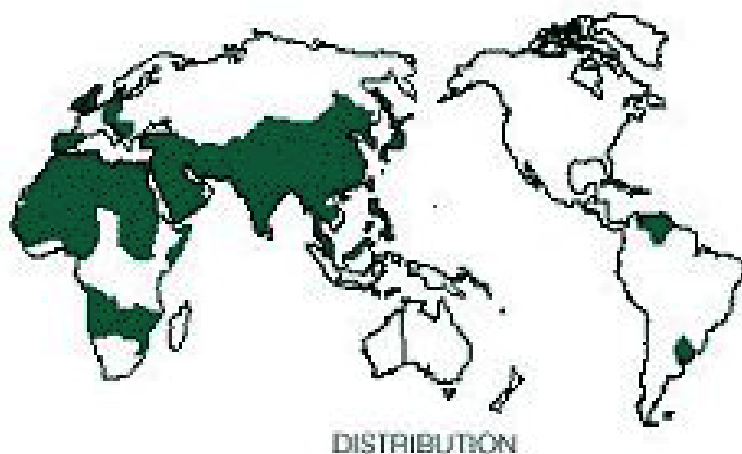
**Fig. 2:** Status report on the Khapra beetle survey in the US

**Spread Potential to Oregon: Medium (numerical score 3)  
Justification**

The Khapra beetle's native range extends from Burma to West Africa limited by the 35° parallel to the north and the equator to the south (Harris, 2009). It has been introduced into other countries in Southeast Asia, China, Japan, Korea, Philippines, the Middle East, Africa, southeast

Europe, Australia (only intercepted), New Zealand (eradicated), Venezuela, Uruguay, and Madagascar where it is considered established (Lindgren et al., 1955; EPPO, 2005; Stibick, 2007; Harris, 2009). The Khapra beetle has been found but is not considered established in several other European countries, Belgium, Denmark, Germany, Ireland, Luxembourg, The Netherlands, UK, and Russia (Shea et al., 2000; EPPO, 2006).

The beetle has never been observed to fly therefore introduction into Oregon would exclusively be by movement of infested commodities (Harris, 2009). Treatments of stored products generally applied for international trade may mitigate the risk of Khapra beetle importation.



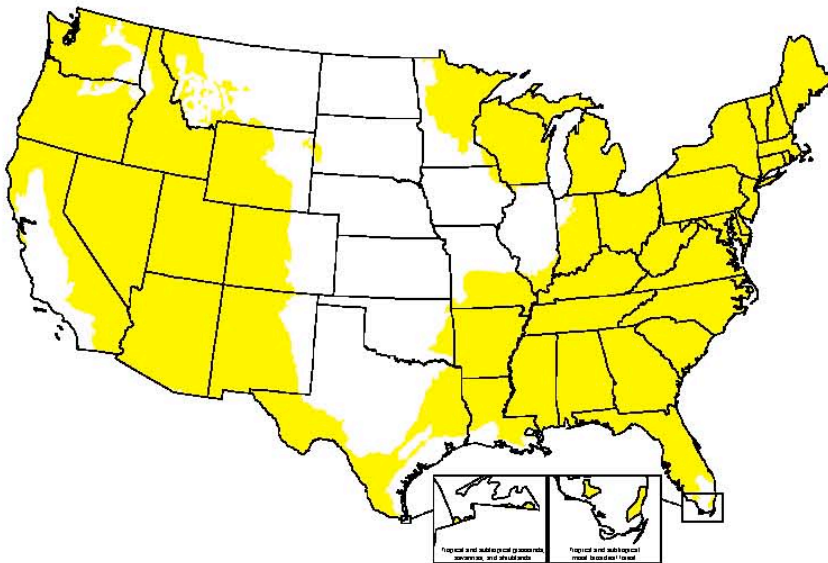
**Fig. 3:** Global distribution of the Khapra beetle

#### **Establishment Potential in Oregon: High (numerical score 4)**

##### **Justification**

The Khapra beetle has been intercepted multiple times at US ports and entry points, averaging 20 interceptions per year (French and Venette, 2005). Most interceptions were associated with international luggage (54%), general cargo (24%) and ship stores (10%). Most interceptions occur in Texas (42%), New York (9%), California (8%), and Georgia (6%). Interceptions are associated with seed (>35%) (French and Venette, 2005).

Although unlikely to become established in most climates in the United States, the Khapra beetle can easily survive in almost any storage facility (Stibick, 2007). Several historic infestations in California, Texas and other states support the high probability of establishment in the US. The Khapra beetle is considered a tropical to temperate pest, which prefers dry desert and xeric shrub lands, tropical and subtropical grasslands, savannas, and broadleaf and mixed forests (French and Venette, 2005; Stibick, 2007). According to a USDA APHIS prediction map most of Oregon would have a suitable climate for the Khapra beetle (French and Venette, 2005).



1. Predicted distribution (shaded yellow) of *Trogoderma granarium* in the contiguous US.

**Fig 4:** Predicted distribution of the Khapra beetle in the US

**Environmental Impact Potential to Oregon: Low (numerical score 2)**

**Justification**

The Khapra beetle would probably have a minimal direct impact on the environment. Khapra beetle populations are generally confined to storage facilities and warehouses with little effect on natural environment or threatened and endangered species (French and Venette, 2005; Stibick, 2007). However, chemical treatment of an infestation could result in adverse effects on the environment, i.e., when using methyl bromide, a known ozone depleting gas.

**Economic Impact Potential to Oregon: High (numerical score 4)**

**Justification**

Due to its “dirty feeding” behavior, contamination through fecal material and cast larval skins, the Khapra beetle damages more seeds than it actually consumes (Stibick, 2007). Direct feeding of the Khapra beetle larvae damages and reduces the weight and grade of commodities affecting the quality of the commodity as well as the quantity. Severe infestations may make the product unpalatable and unmarketable. In addition, the mere presence of the Khapra beetle has a significant adverse economic impact on international trade due to quarantine restrictions imposed on infested countries.

The Khapra beetle will affect:

Primary seed and cereal grain hosts: barley, corn, cowpea, oat, garbanzo, garden pea, grain, lentil, rice, sorghums, soybean, and wheat

Preferred animal feeds and concentrates: dog food, orange pulp, rolled and ground barley, and wheat bran

Nuts: almond, peanut, pecan, and walnut

Grocery commodities: alfalfa, bread, crackers, cereals, dried coconut, lima bean, noodles, raisins, wheat flour, and wheat germ,

### **Conclusion**

Considering the widespread global distribution and high probability of accidental introduction, the Khapra beetle is considered a high-risk pest for Oregon. Although the environmental impact will likely be minimum the presence of an established Khapra beetle population in Oregon would adversely affect our economic trading relationships with other trading partners and countries and cause direct damage to commodities.

### **Literature consulted**

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