The Walnut Twig Beetle and its Association with 1000 Cankers Disease of Walnut

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Thousand Cankers Disease

– An Insect/Fungal Disease Complex affecting some *Juglans* spp.

Unexplained decline of black walnut has been observed in many western states in past decade

In affected trees there is an associated twig beetle – the walnut twig beetle (*Pityopthorous juglandis*)

First records of this insect from Colorado were established in 2004 (Boulder, Westminster)

Great picture by Jim LaBonte, OR Dept. Agriculture!

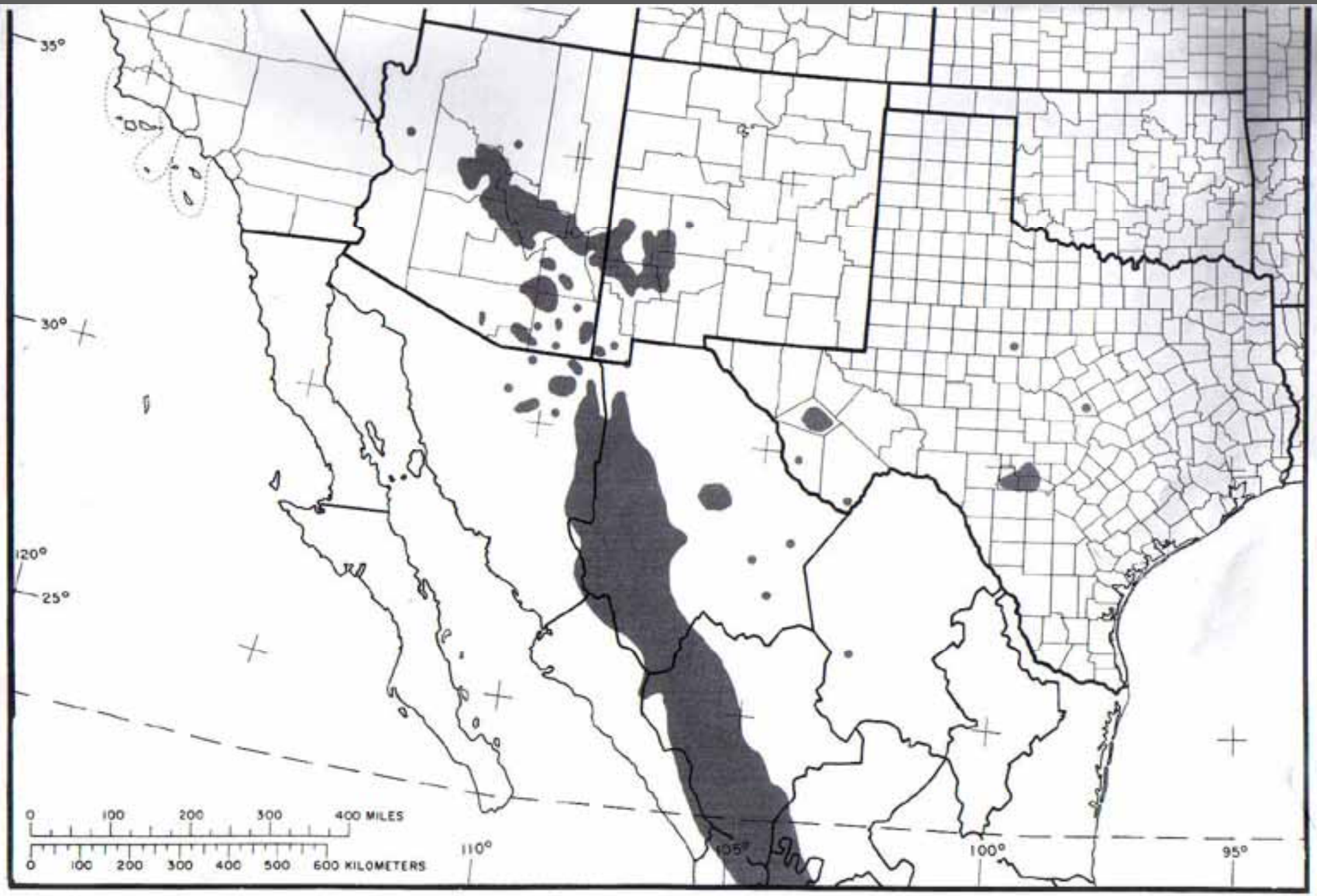
The walnut twig beetle is a minute bark beetle.

It is one of few *Pityophthorus* species that develop in hardwoods.

Pityophthorus bark beetles are collectively known as “twig beetles” because they normally restrict damage to small diameter twigs.

Arizona walnut (*Juglans major*) – Host associated with original descriptions of the walnut twig beetle

Distribution of Arizona walnut



Map 92-SW. *Juglans major* (Torr.) Heller, Arizona walnut.

Arizona walnut is a common species found in canyons and along riverways

In Arizona walnut the insect acts as a “typical” twig beetle

In black walnut in Colorado beetles regularly attack all diameter branches – and are even found in the trunk.

Trees typically die within three years after initial symptoms of leaf yellowing and dieback are first detected.

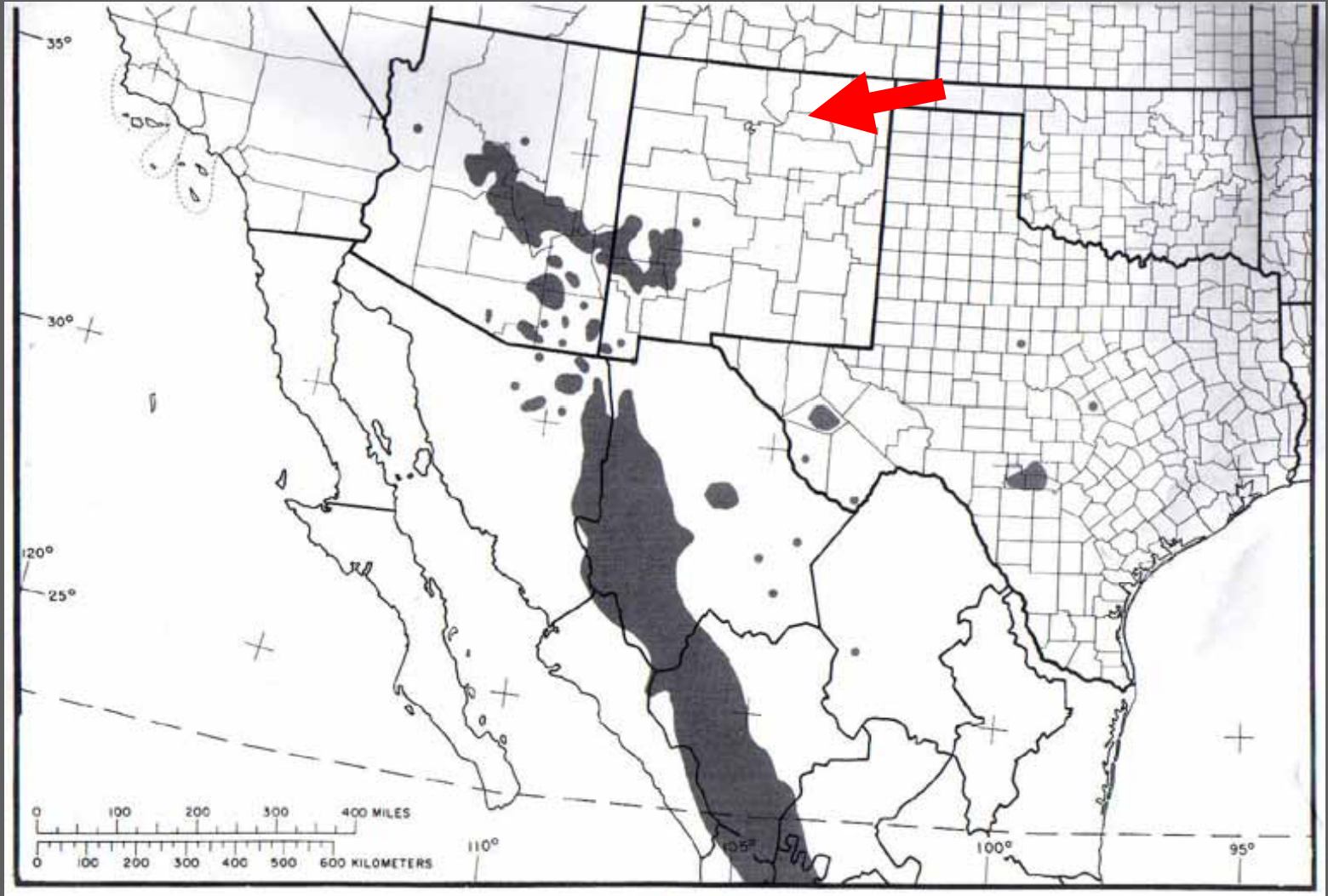
Dark cankers are present in limbs

Massive trunk cankers are observed in end stages

Usually these are on south, west sides

Observations on this black walnut problem have accelerated since 2006

The first published association of walnut twig beetle with black walnut in decline occurred in the Espanola Valley area of northern New Mexico (2002)



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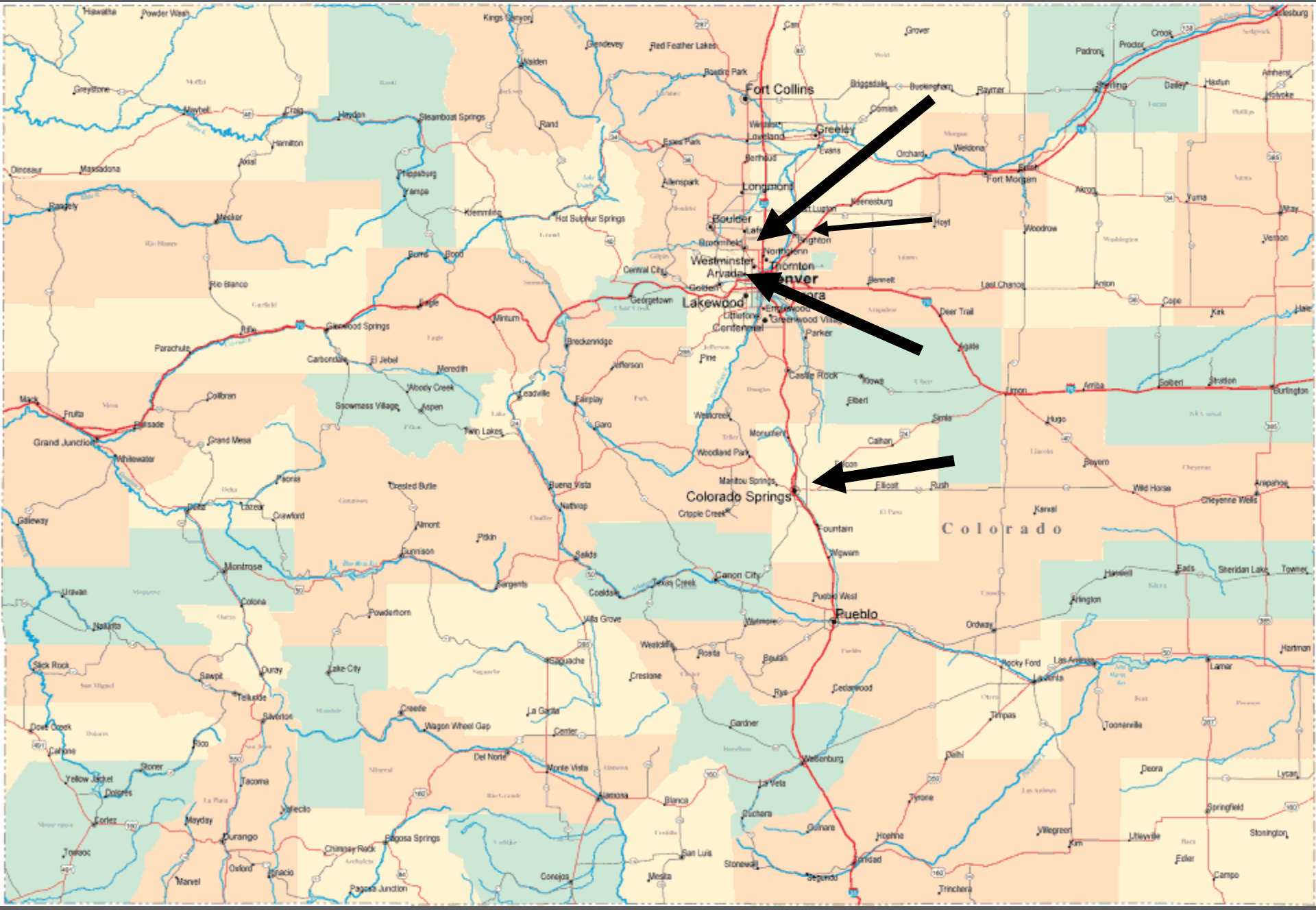
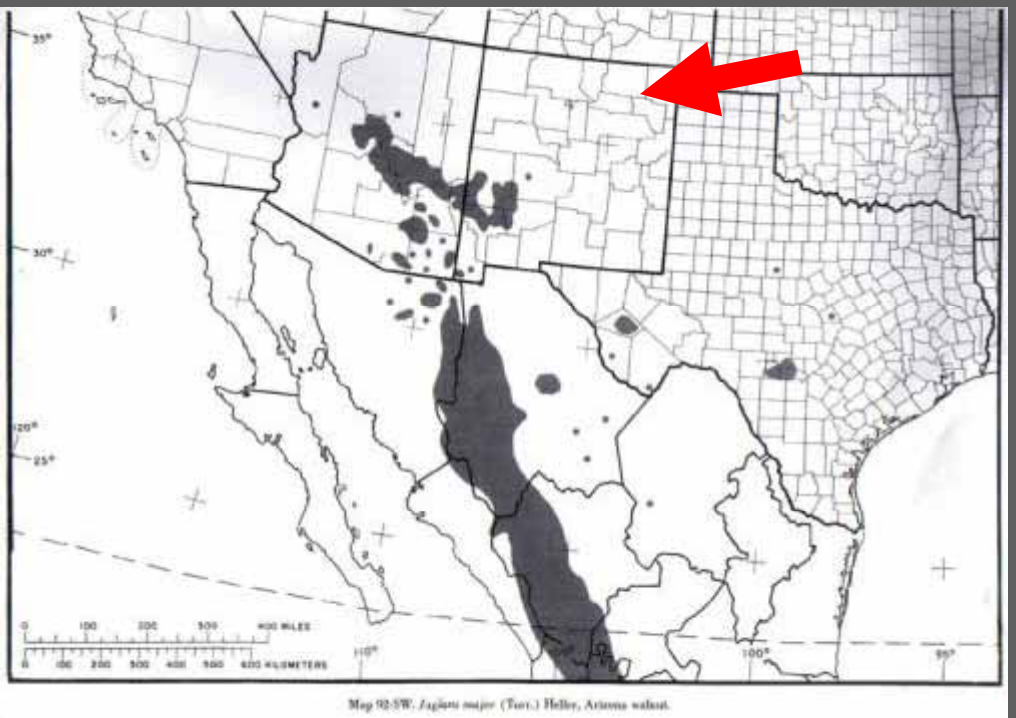


Walnut decline hot spots in Colorado - 2008



Map 92-SW. *Juglans major* (Torr.) Heller, Arizona walnut.

In New Mexico and Colorado the decline of black walnut and the involvement of walnut twig beetle was originally assumed to be associated with drought.

Other Recent New State Records for Walnut Twig Beetle

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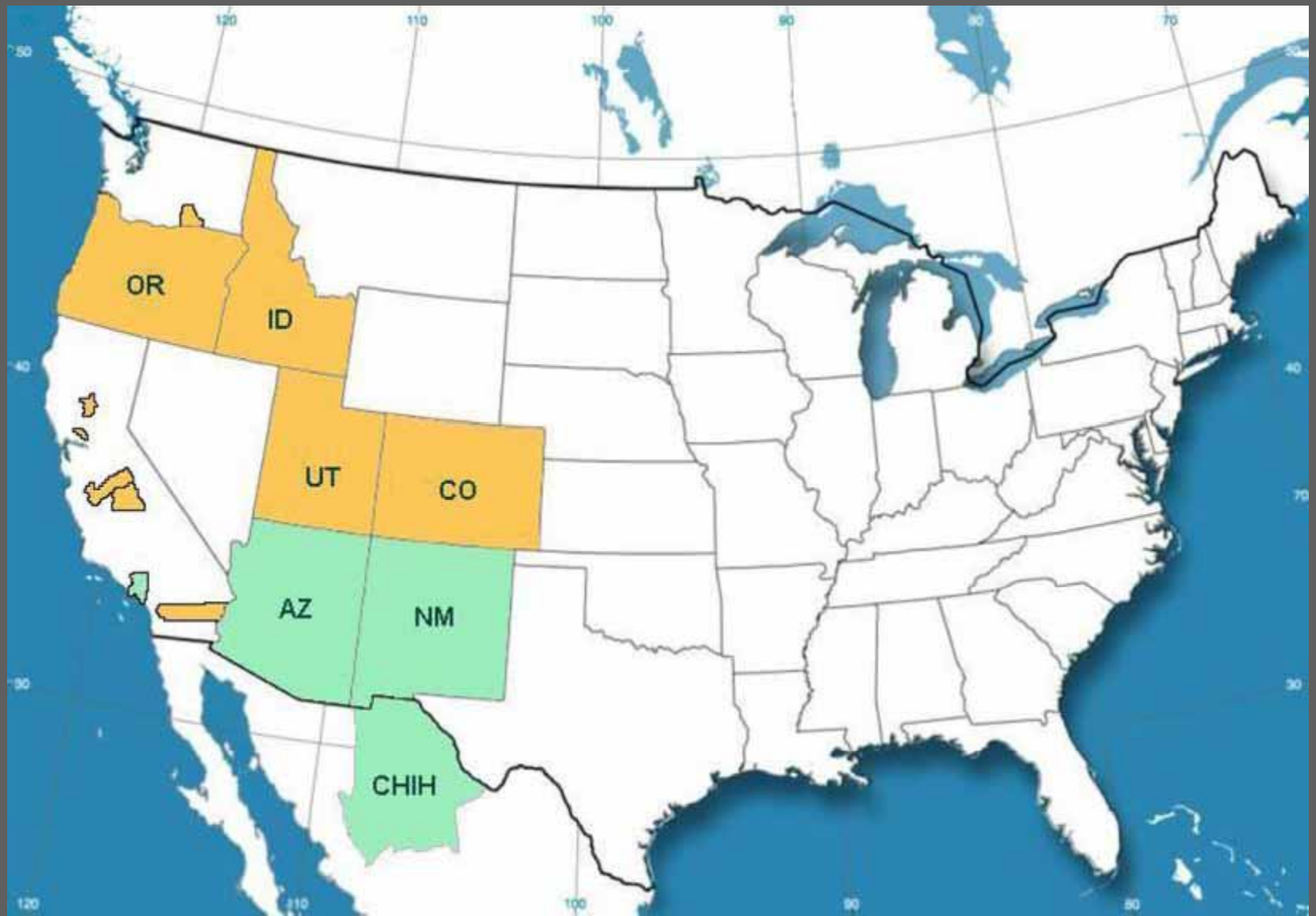
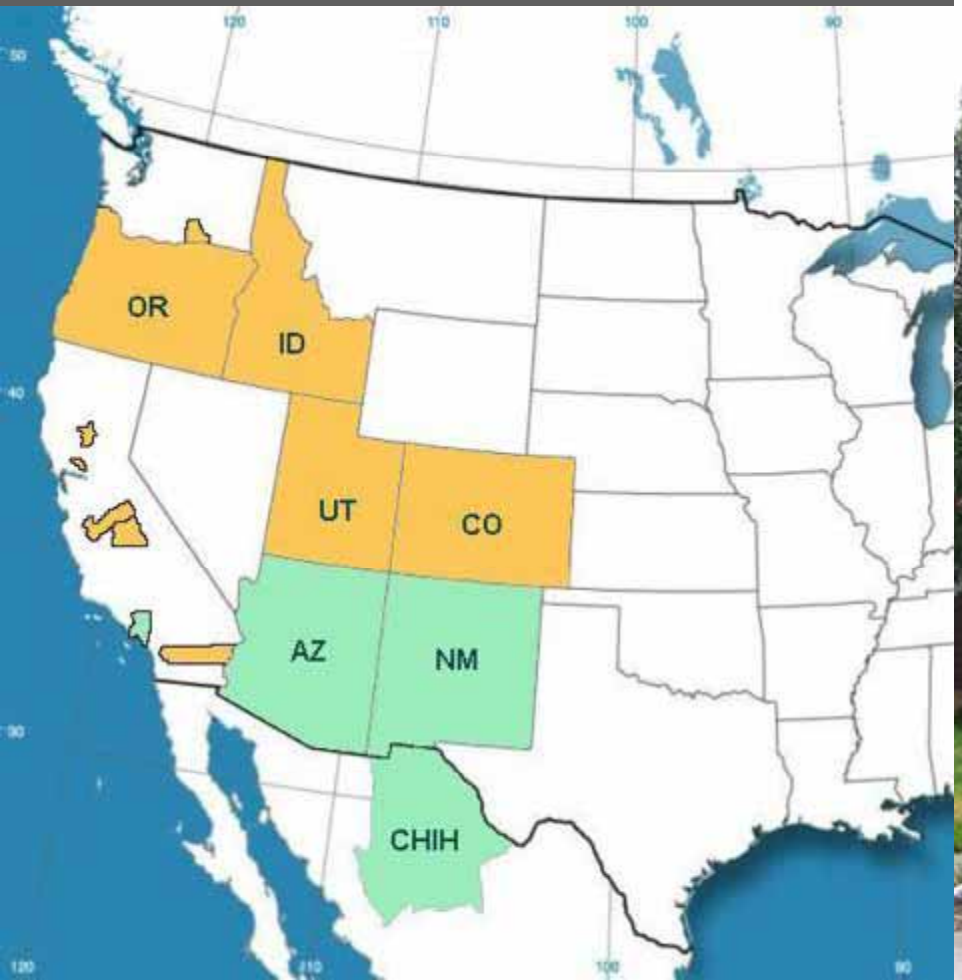
- **WA – Recovered from Prosser area**

Since 1992 there have been new state records for the walnut twig beetle in many western states – CO, UT, ID, OR and, in 2008, WA



Most all of these new detections of walnut twig beetle have been associated with black walnut die-offs.



The Big Question

How can a little twig beetle be killing healthy trees???

There is a *Geosmithia* sp. fungus associated with the twig beetle

The *Geosmithia* fungus is carried into the tree when the beetles tunnel

The fungus produces large cankers in the area around its introduction by the bark beetle

Both twig beetle and fungus act very aggressively in black walnut

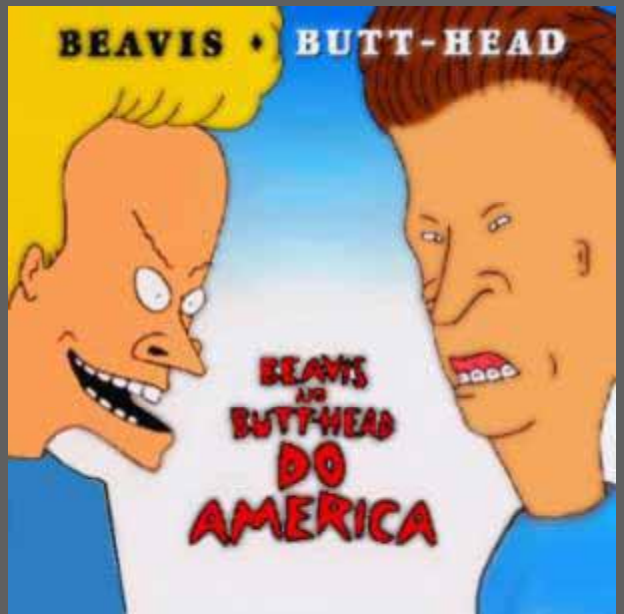
Massive numbers of cankers girdle the trees leading to dieback and decline.

How did this happen?

- Somehow the beetle jumped hosts.

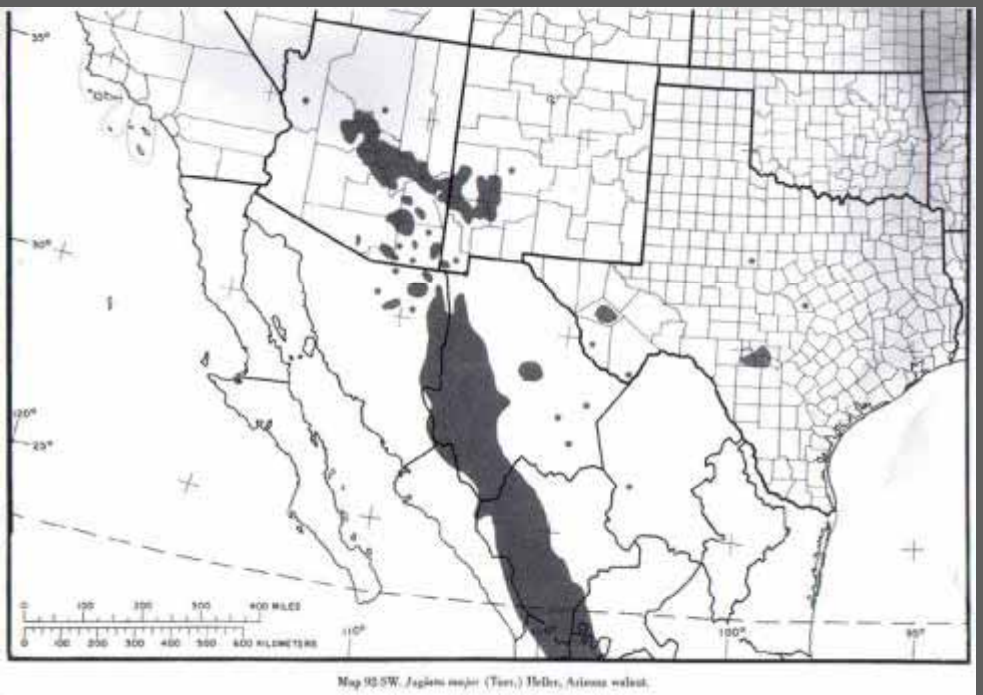
Walnut Twig Beetle Colonization of the West

“Big Bang” or “Buttheads”



Spread of walnut twig beetle through the western states involved human transport of infested wood products

How likely is near simultaneous movement of Arizona walnut wood to multiple western states – and nowhere else?



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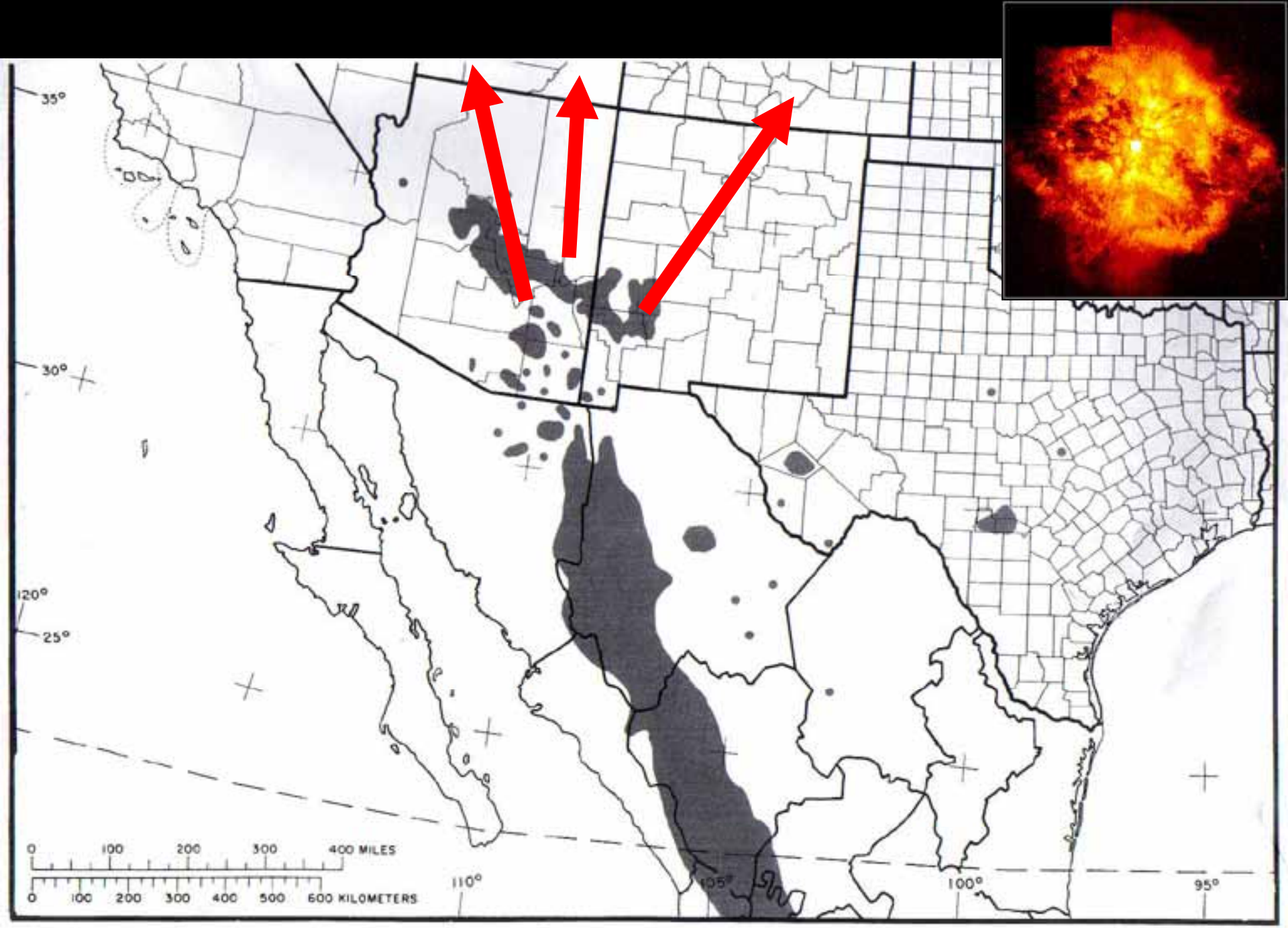

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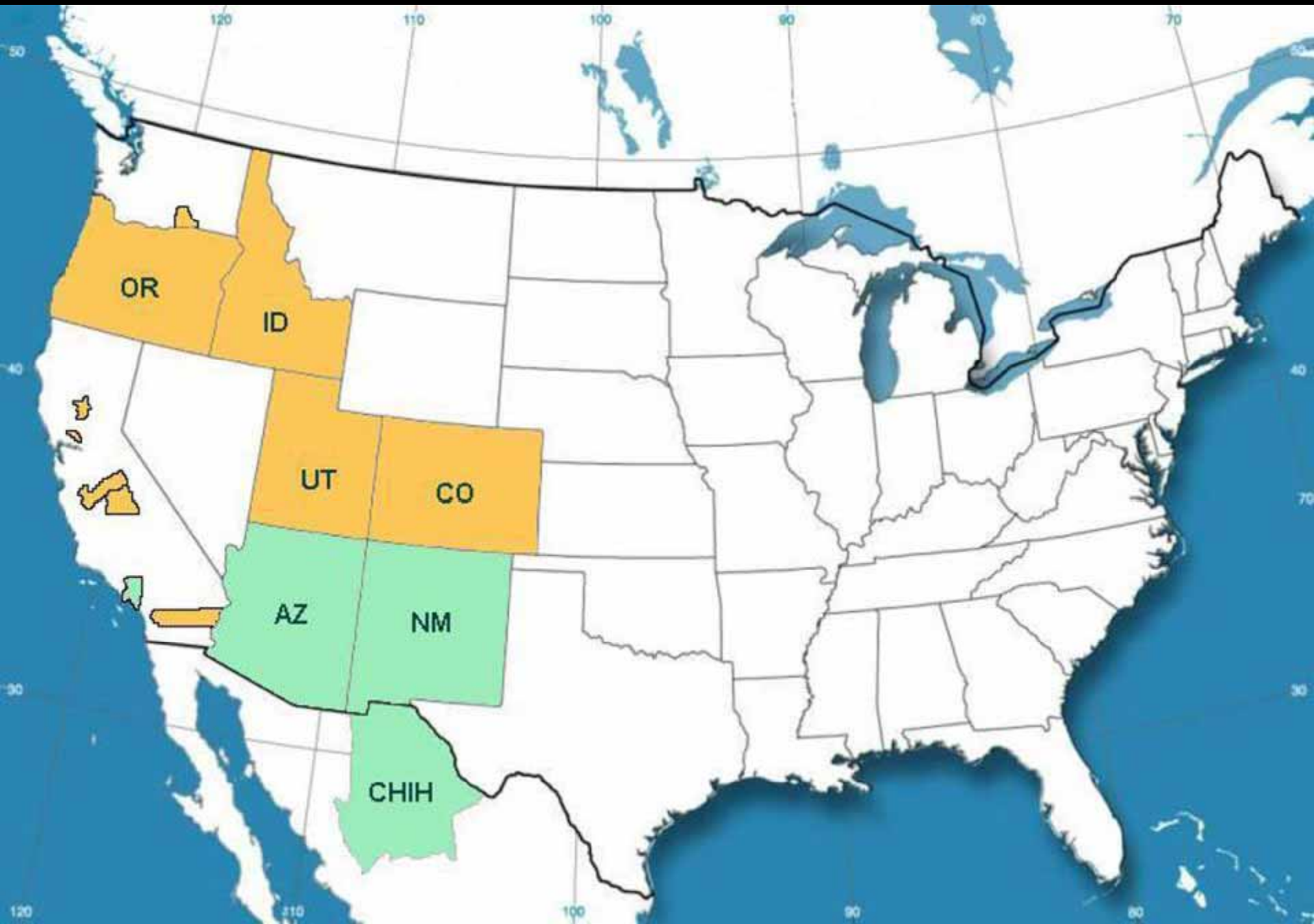

OR
ID
UT
CO
AZ
NM
CHIH

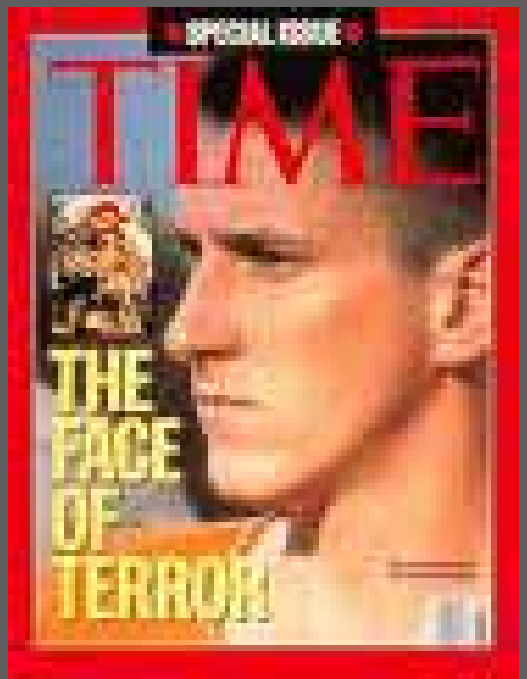
A native species jumped plant hosts.

An analogy for regulatory people that may want to help provide funding

Emerald ash borer is to Al-Queda……

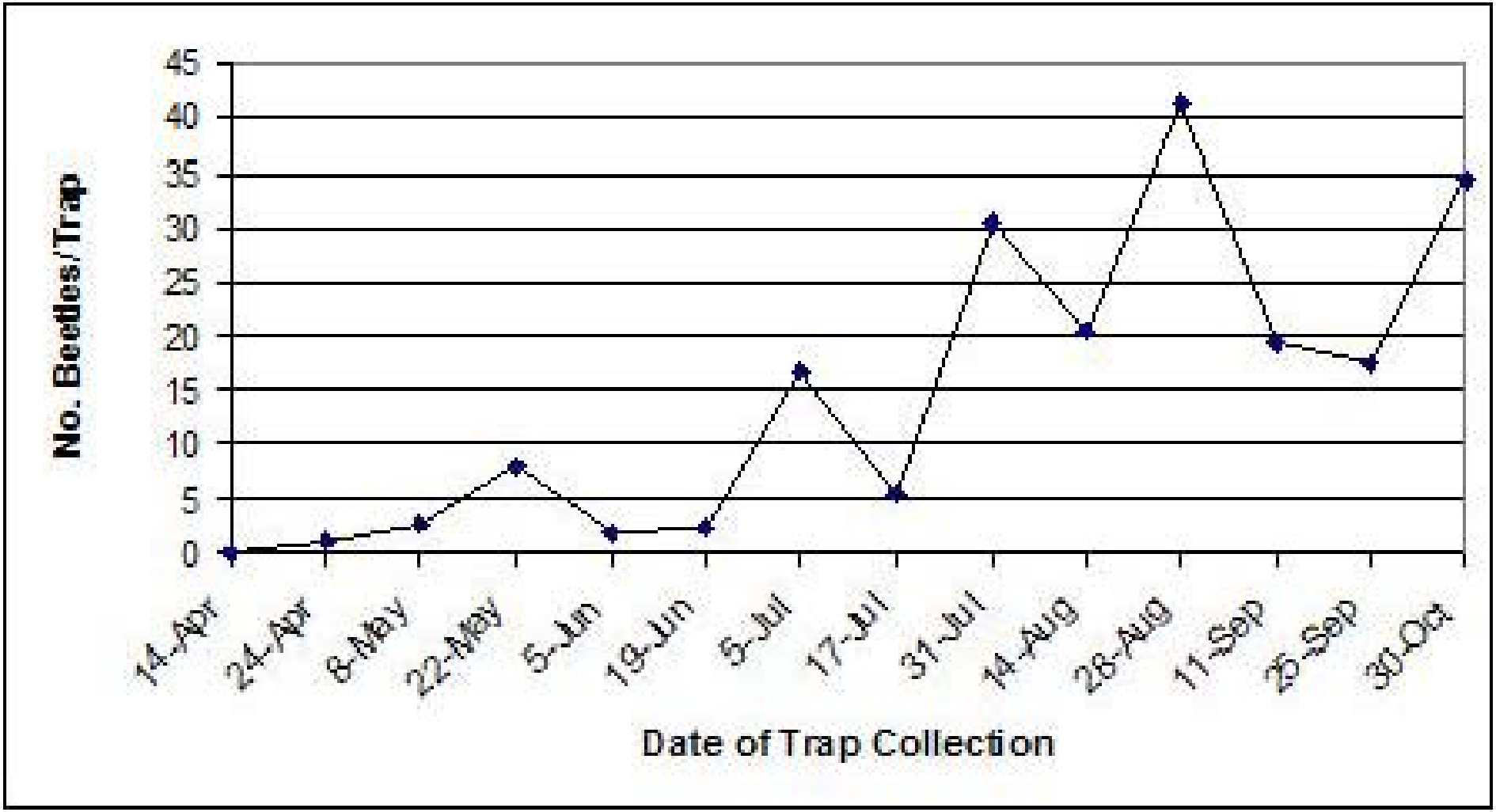
An analogy for regulatory people that may want to help provide funding

…as Walnut twig beetle is to Timothy McVeigh



Walnut twig beetle life cycle?

Walnut Twig Beetle Captures in Yellow Sticky Traps. Boulder, 2006



Spring colonization by adult beetles occurs in late April and early May

Patterns of attack

- Base of twigs, rough areas of bark frequent points of entry
- Underside of branches preferred
- Possible orientation of trunk attacks

Larval development takes about 6-8 weeks to complete.

There are probably two generations typically produced per season.

Another great picture by
Jim LaBonte

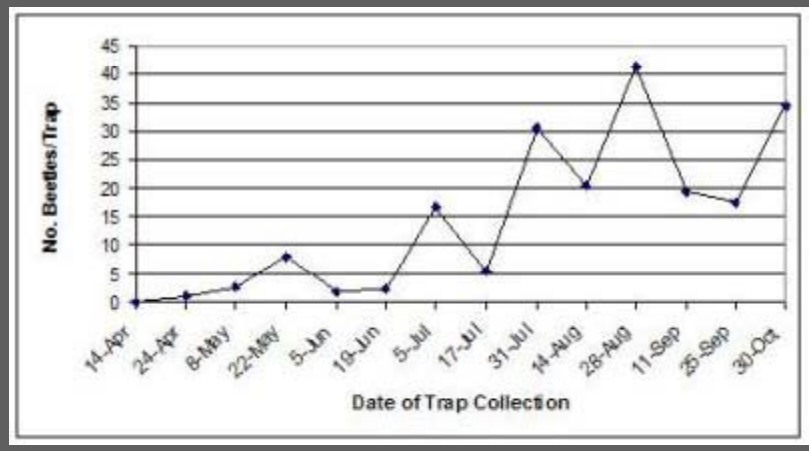
At the end of the summer the adult beetles move into the trunk and hibernate within chambers excavated in the bark.

Thoughts on Twig Beetle Management

- Drenching branch sprays
- Soil-applied systemic insecticides
- Late summer trunk treatment

Drenching branch sprays for walnut twig beetle

Foliar treatments?



The beetle attacks all areas of the tree. Attacks can occur over a period of several months (mid-April through mid-September). ***Establishment and maintenance of coverage will be very difficult.***

Imidacloprid soil drenches/injections?

The fungus grows ahead of the beetle.

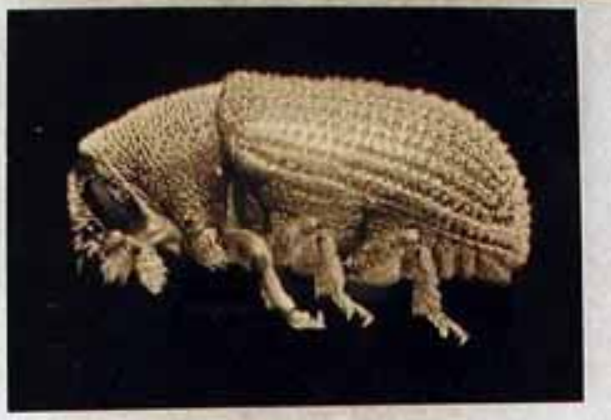
Cankered areas may prevent movement of insecticide to the beetle feeding site.

Does the overwintering hibernation habit provide a point for management?

Management of walnut twig beetle using the management model for the native elm bark beetle.

Typical healthy elm trees. Such trees may become inoculated with Dutch Elm Disease fungus spores by adult beetles.

The native elm bark beetle, Hylurgopinus rufipes (Eich.), a vector of the Dutch Elm Disease Fungus Ceratostomella ulmi (Schwarz) Buisman.



Adult (enlarged 27 times)

Typical appearance of elm tree affected by the Dutch Elm Disease. Adult beetles issuing from such trees can carry spores of the fungus to healthy trees.

Disease spores introduced into healthy elm by disease carrying adults that bore into the bark for hibernation and in the spring sometimes penetrate farther, cutting into or through the xylem vessels. Crotch feeding by adults of this bark beetle very rarely, if ever, occurs. Varying proportions of the population of H. rufipes also hibernate as partially developed larvae within the bark of dying elm.

Inner bark showing galleries. As the larvae near maturity they mine toward the surface of the bark.

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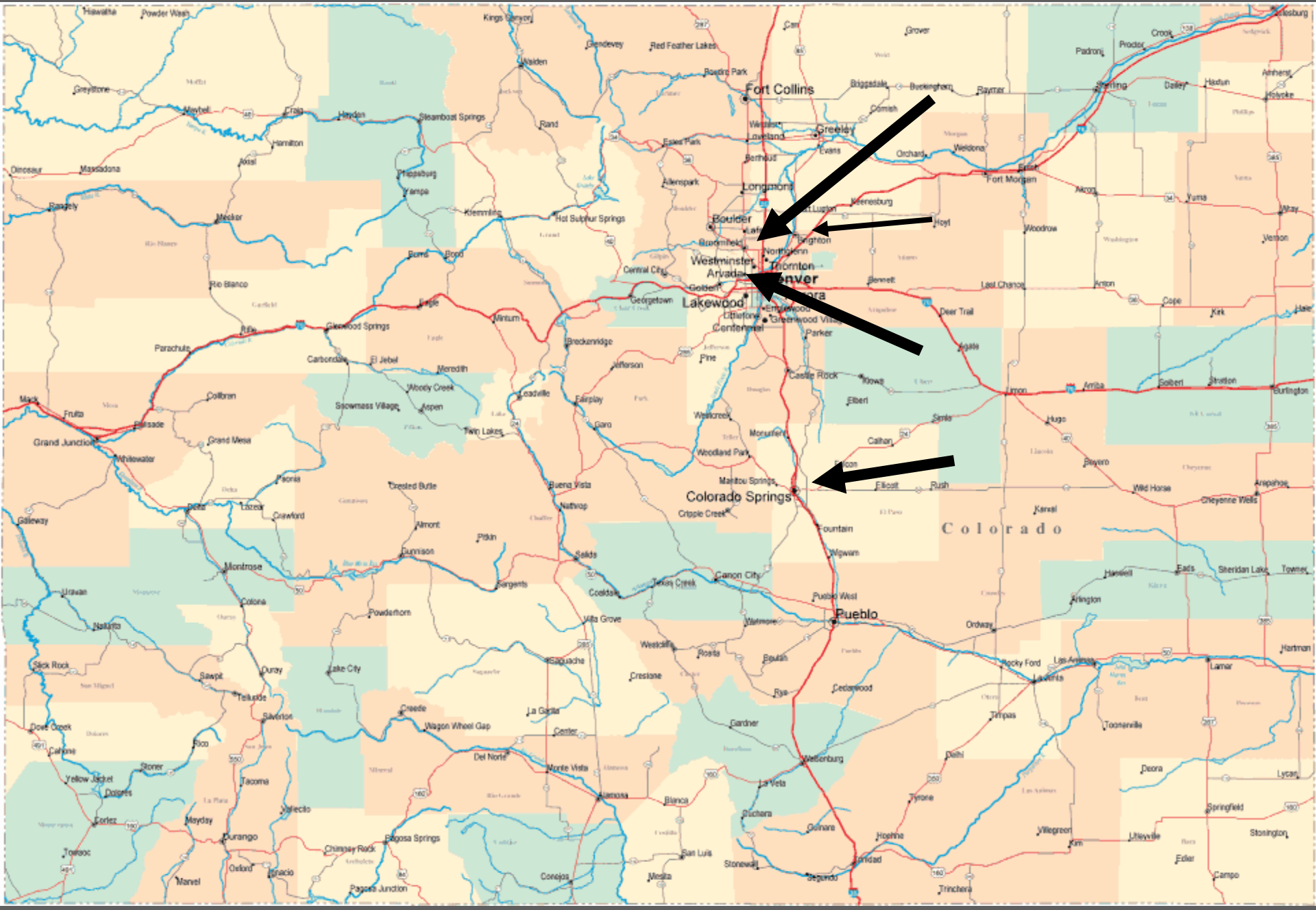
UGA2252073

Establish current distribution of 100 cankers disease



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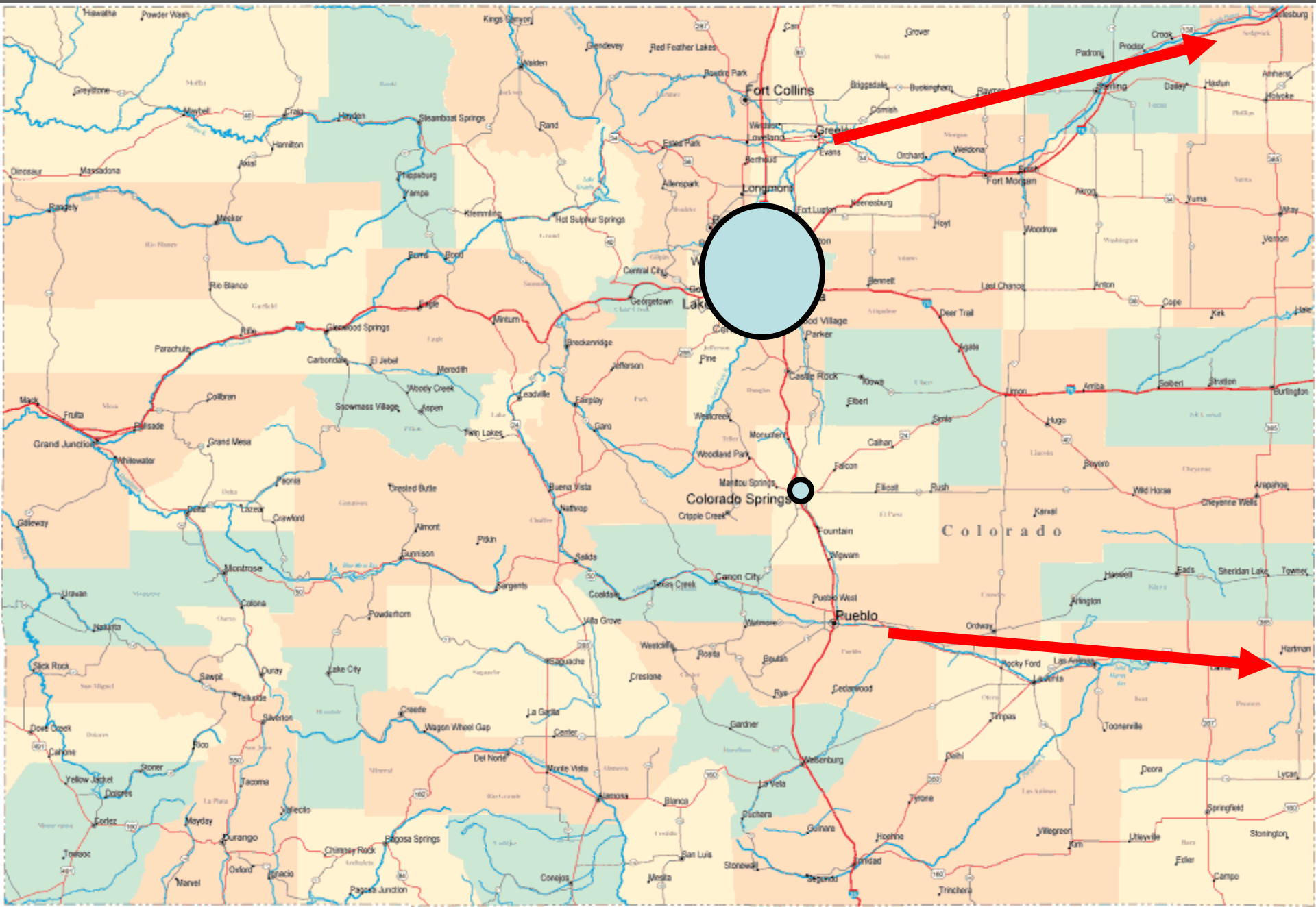
Likely routes of walnut twig beetle natural spread – if it leaves the state



Long distance movement of walnut wood killed by 1000 cankers disease will be a *huge* issue due to the high value of the saw logs

This information gleaned from many people including:

Curtis Utley,

Ned Tisserat,

Don Bright,

Dave Leatherman,

Kathleen Alexander,

Steve Seybold….