Section III
Field Crop Pests

POTATO TUBERWORM UPDATE IN THE PACIFIC NORTHWEST

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Abbreviations: Potato Tuber Worm (PTW); Pacific Northwest (PNW); Oregon (OR); Washington State (WA); California (CA); Idaho (ID)

The potato tuberworm, *Phthorimaea operculella* (Zeller) is a worldwide pest of solanaceous crops especially devastating to potatoes. The pest infests potato plants throughout the growing season; larvae mine leaves, stems, petioles, and excavate tunnels through potato tubers which is considered the typical damage. The history of PTW in the PNW dates back to the mid-1800's when PTW was recorded in CA as early as 1856. In the early 1900's, the presence of PTW was reported in WA in the Seattle, Auburn and Yakima areas. Additional information of the presence of PTW in the PNW dates back to 1959 (Boise, Idaho) and 1972 (Corvallis, OR). This information is based on samples deposited in entomological museums but not based on written reports. No further evidence of PTW in the PNW existed until 2000 and 2001, when tubers suspected to have been damaged by PTW were found in OR. However, PTW was not a major concern for growers in the Columbia Basin potato production region until 2002 when a field with severe tuber damage was documented in northeastern OR, and was not considered an issue in WA until the following year. By 2004, large numbers of the insect were confirmed from pheromone traps placed in Umatilla and Morrow counties (OR), the southernmost region of the Columbia Basin potato production area, and from

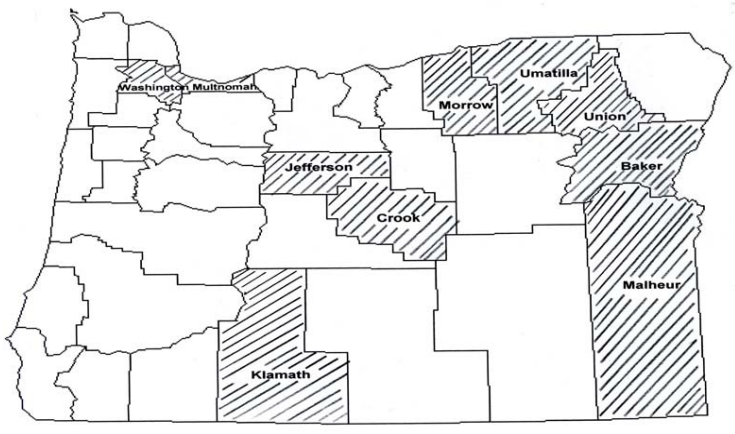

Fig. 1. PTW in Oregon counties in which PTW has become established are marked

southern WA. Idaho, one of the major potato production areas in the United States, confirmed the occurrence of the insect in 2005. In OR, 2006, PTW had spread beyond Umatilla and Morrow counties, to western, central, and eastern Oregon potato production areas including Washington, Multnomah, Jefferson, Crook, Klamath, Union, Baker, and Malheur counties, although no damage has been reported in any of these areas (Fig. 1). In addition, PTW was confirmed in at least three counties in western ID in 2005 (Canyon, Payette, and Elmore counties); however, only adults have been observed and no foliar or tuber damage has been detected at present.

Current situation of PTW in OR

In 2005, the average number of PTW per trap per week in the lower Columbia Basin in OR, based on 35 traps, was high as compared with the number of PTW per trap per week in 2006, 2007, 2008 or 2009 (Fig. 2). In 2005, the highest numbers of moths trapped per week per trap was around April-May. In 2006, 2007, 2008 and 2009, PTW populations were low throughout the season but increased by the end of June with a peak on early September. Those high numbers were observed during the critical time of harvest (late August early September).

PTW Facts

- PTW is considered one of the most important potato pests worldwide because of its close relationship with its host, high adaptability to daily and seasonal changes, high reproductive potential, and economic damage
- While foliar damage to the potato crop does not usually result in significant yield losses, infested tubers may reduce marketability and damage can be magnified in storage, especially in non-refrigerated systems
- In the PNW, control of PTW is critical because potatoes are mostly stored and tubers infested with live larvae are considered unmarketable (there is a zero level of tolerance for live *P. operculella* larva in fresh and processed potatoes).
- PTW has four life stages: adult, egg, larva and pupa. Length of time between instars is closely influenced by temperature.
- Minimum developmental threshold of egg, larval and pupal stages in OR is between 5 and 8 ºC suggesting that this insect can survive the mild winters of the PNW.
- In the Columbia Basin, trapping data from spring 2004 to fall 2005 showed that *P. operculella* males were present and active every week except one (in mid-January), with the highest numbers per trap occurring in December where the average temperature is around -0.09^{o}C . Thus, "warm" winters may partially explained high PTW populations the following season
- Considering that most of the economic damage by this insect occurs when the insect infests tubers, early attempts to control this pest should focus on cultural methods. Deeper seed planting, hilling the rows, irrigation and early harvest are a few of the methods suggested to prevent tuber infestation since these methods discourage egg-laying moths from finding oviposition substrates.
- The use of chemicals before and at vine-killed are still the main foundation of integrated pest management programs to control PTW.

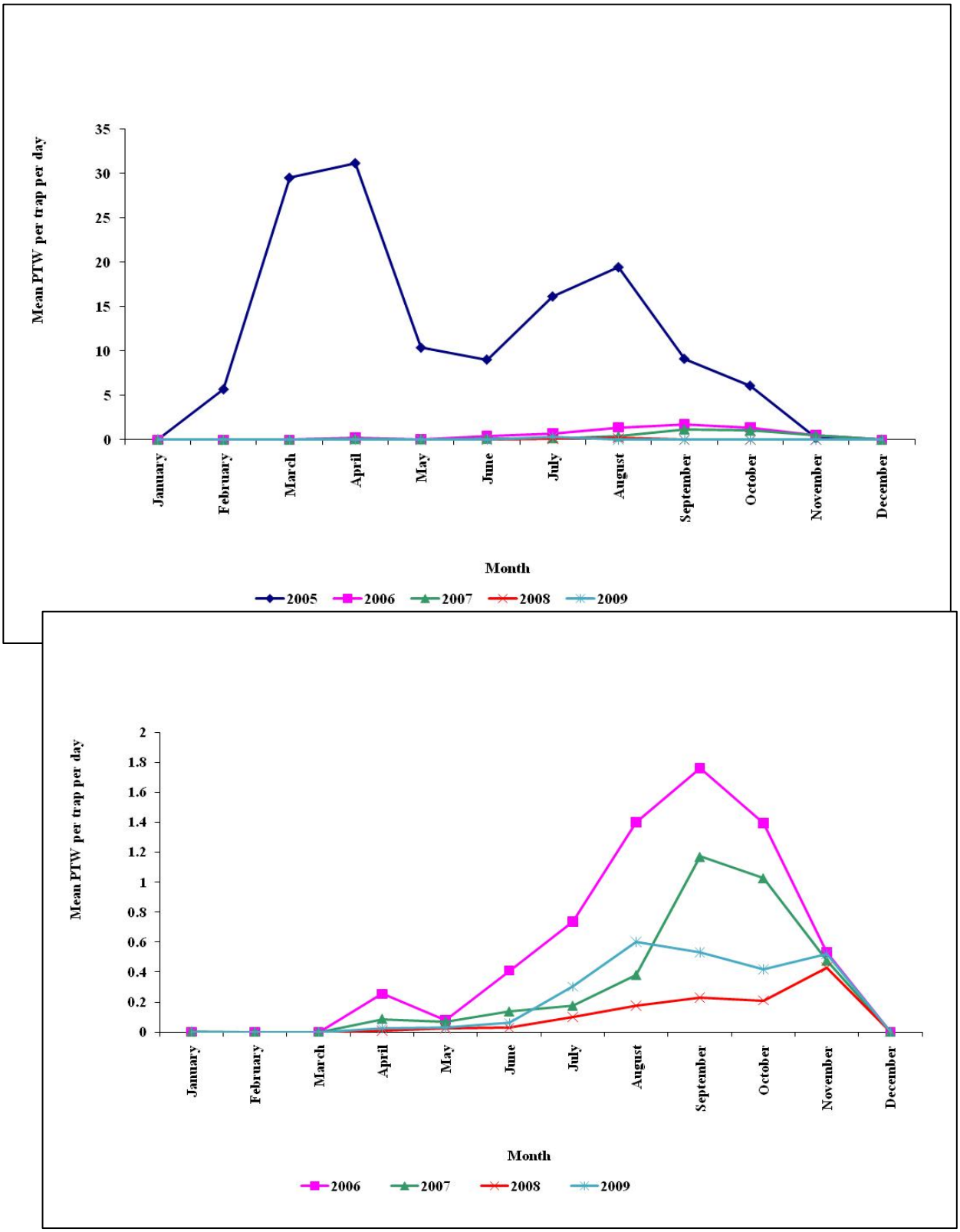

Fig. 2 Population dynamics of PTW in Umatilla and Morrow Co., OR 2005-2009 (above); 2006-2009 (below)

More information

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