Introduction
Throughout history, mosquitoes have transmitted some of the most important and deadly diseases to humans. Their role in vectoring diseases such as malaria, West Nile, dengue, and chikungunya make mosquitoes arguably the most dangerous animals in the world. Worldwide, malaria alone accounts for more than 600,000 deaths each year, most of them are children under the age of five. Recently, the outbreak of another mosquito-borne illness, Zika virus, has dominated national headlines. With the number of confirmed cases in the Americas on the rise, the public demand for wide-spread mosquito management has never been greater.

Zika Virus Disease
Zika virus disease (Zika) is caused by an emerging mosquito-borne virus that has no specific medical treatment or vaccine. The virus is spread to people primarily through the bite of an infected mosquito in the *Aedes* genus, the same mosquito responsible for transmitting yellow fever, dengue fever and chikungunya viruses. The symptoms of the illness are generally mild, but Zika virus infection during pregnancy can cause serious birth defects including microcephaly. In addition, infection may also be linked to neurological disorders such as Guillain-Barré syndrome.

Zika virus was first isolated in 1947 from a rhesus monkey in Uganda’s Zika forest, but the first human cases of Zika were not detected until 1952. In 2007, a large epidemic of Zika virus was reported in Yap Island and Guam, Micronesia. In 2013 and 2014 multiple epidemics were reported in several Pacific Islands. By May 2015, the Zika virus was reported in Brazil as well as several countries of South and Central America and the Caribbean. Only eight months later, Brazil totaled nearly 30,000 reported cases of infection. The virus is now widespread in Brazil, and is continuing to spread throughout the Americas as well as the Oceania and Pacific Islands. In the United States, the Centers for Disease Control and Prevention reported that Zika virus disease has been confirmed in 42 states, but there have been no locally acquired mosquito-borne cases reported as of April 2016.

Zika Virus Vectors
The yellow fever mosquito, *Aedes aegypti*, is a small to medium-sized mosquito, approximately 4 to 7
millimeters in length (Fig. 1). It can be identified by the pattern of white scales on the dorsal surface of the thorax that form the shape of a violin or lyre. Additionally, the hind legs have bands of white scales that appear to be stripes. The yellow fever mosquito is the principal mosquito vector of Zika and it is present in the United States. It prefers to feed on humans over other animals. As the common name suggests, this mosquito is also the primary vector of yellow fever as well as a vector of dengue and chikungunya. The yellow fever mosquito is a tropical mosquito species that thrives in warmer, humid conditions typical to the southern United States (Fig. 2).

The Asian tiger mosquito, *Aedes albopictus*, is medium-sized (2 to 10 mm in length) and closely resembles the yellow fever mosquito (Figure 3). These species can be distinguished by differences in scale patterns on the thorax of adults. The Asian tiger mosquito has a prominent single stripe of white scales down the middle of the dorsal surface of thorax that differs from the violin shape of white scales seen on the yellow fever mosquito. The Asian tiger mosquito has been implicated as a competent vector of Zika in other countries and could pose a similar risk in the United States. It is also capable of vectoring other viruses including dengue fever and Eastern equine encephalitis virus. The Asian tiger mosquito has adapted to survive in a broader temperature range and at cooler temperatures than the yellow fever mosquito. As a result, the Asian tiger mosquito can tolerate more temperate climates and has a broader distribution in the United States than the yellow fever mosquito (Figure 2).

The yellow fever and Asian tiger mosquito live in close association with humans, largely due to their preferences in breeding sites. Both species seek out natural and artificial water-holding containers such as tree holes, bird baths, or plastic containers to lay their eggs. They can complete their lifecycle in as little as one half inch of water, making nearly any sized container a potential breeding site. After taking a blood meal, the female lays 100–200 black eggs (0.5 mm in length) in small batches, across multiple sites. Each egg is glued to the inner wall of a container, just above the waterline. Following a rain event, the water level rises, submerging the eggs, triggering them to hatch. If the container dries out, the eggs can survive desiccation for eight months or more. Larval development is temperature dependent, but both species can reach adulthood in as little as seven days under ideal conditions.

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While the risk of Zika virus and other viruses transmitted by these mosquitoes is low, to prevent mosquito bites in general, the U.S. Centers for Disease Control recommends applying EPA registered insect repellents containing the active ingredients DEET, picardin, oil of lemon eucalyptus (OLE), or IR3535 to exposed skin according to label instructions.
growth regulator, does not kill mosquito larvae, but prevents them from developing into adults. Bti is bacterium that produces a toxin that is lethal to larvae upon ingestion. Adulticides can be applied using a gas-powered backpack mist blower to treat adult mosquito resting places such as shrubbery and other vegetation with an appropriately labeled residual insecticide. Mist blower applications allow for the deposition of insecticide onto the underside of leaves and interior architecture of shrubs more effectively than compressed air sprayers. Use caution to avoid treating plants that are in bloom and attractive to pollinators. Foundation walls and the undersides of decks may also be treated, as adult yellow fever and Asian tiger mosquitoes (as well as others), may rest there as well. Always read and follow all label instructions.

**Personal Protection**
Managing mosquitoes requires pest management professionals to spend time in areas where mosquitoes are active, which can increase the risk of mosquito bites. While the risk of Zika virus and other viruses transmitted by these mosquitoes is low, to prevent mosquito bites in general, the U.S. Centers for Disease Control recommends applying EPA registered insect repellents containing the active ingredients DEET, picardin, oil of lemon eucalyptus (OLE), or IR3535 to exposed skin according to label instructions. When also using sunscreen, apply it before the repellent.

**Additional Information**
- For the latest information on the distribution of the yellow fever and Asian tiger mosquitoes in the United States, visit: [http://www.cdc.gov/chikungunya/resources/vector-control.html](http://www.cdc.gov/chikungunya/resources/vector-control.html)
- For more information on insect repellents, visit: [http://www.cdc.gov/westnile/faq/repellent.html](http://www.cdc.gov/westnile/faq/repellent.html)