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DISTRIBUTION OF INVASIVE *AEDES* MOSQUITOES IN WEST-CENTRAL ILLINOIS, 2014–18: RECORD UPDATES FOR *AEDES JAPONICUS* AND *AE. ALBOPICTUS*

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ABSTRACT. A comprehensive surveillance of *Aedes* mosquitoes in west-central Illinois has not been conducted in recent years, resulting in incomplete distribution records for several Illinois counties. As of 2014, out of 102 Illinois counties, active populations of *Ae. japonicus* had been confirmed in 15 counties, and *Ae. albopictus* confirmed in 34 counties. The Miller laboratory at Western Illinois University (WIU) began the WIU Vector Biology Initiative (WIU-VBI) in 2014 to address the lack of mosquito surveillance in west-central Illinois. Through this effort, the presence of *Ae. japonicus* was confirmed for the 1st time in Fulton, Hancock, and Schuyler counties, IL, from 2014 to 2018. Actively breeding populations were confirmed in Cass, Fulton, McDonough, and Schuyler counties, IL. Additionally, *Ae. albopictus* was observed for the 1st time in Cass, Fulton, Hancock, McDonough, and Schuyler counties, IL, in 2016 and 2017, with active breeding populations in Cass and McDonough counties, IL.

KEY WORDS *Hulecoeteomyia japonica*, Illinois, *Stegomyia albopicta*

INTRODUCTION

Aedes japonicus (Theobald) is a nonnative mosquito species capable of transmitting disease to humans and animals (Bartlett-Healy 2012). It was 1st discovered in the USA in Connecticut in 1997 (Munstermann and Andreadis 1999, Andreadis et al. 2001). Only 1 year later, *Ae. japonicus* was reported in New York and New Jersey during August and September 1998, respectively, using a Centers for Disease Control and Prevention (CDC) light trap (Peyton et al. 1999). As of 2014, *Ae. japonicus* was established in 29 additional states (Kampen and Werner 2014, Kaufman and Fonseca 2014). In 2022, 33 states reported the presence of *Ae. japonicus* (Little et al. 2022). In Illinois, *Ae. japonicus* was 1st captured in Urbana, IL, on July 7, 2006, using a grass-infusion-baited gravid trap (Morris et al. 2007).

Field-collected pools of *Ae. japonicus* have demonstrated field infection of West Nile virus (WNV), La Crosse virus (LACV), and Cache Valley virus (CVV) (Sardelis and Turell 2001; Harris et al. 2015; Westby et al. 2015; Yang et al. 2018; DeCarlo et al. 2020; Eastwood et al. 2020). Additionally, studies have demonstrated laboratory transmission of LACV (Sardelis et al. 2002b), St. Louis encephalitis virus (SLEV) (Sardelis et al. 2003), eastern equine encephalitis virus in North America (EEEV-NA) (Sardelis et al. 2002a), and Rift Valley fever virus (RVFV) (Turell et al. 2013) by *Ae. japonicus*. Vector competence of *Ae. japonicus* has also been demonstrated with chikungunya and dengue viruses (CHIKV and DENV, respectively) (Schaffner et al. 2011, Kampen and Wener 2014), as well as Zika and Usutu virus (ZIKV and USUV, respectively) (Abbo et al. 2020). The emergence of arboviruses in recent years, as well as the potential of *Ae. japonicus* to harbor and spread these viruses, presents a global health threat.

Prior to *Ae. japonicus* detection, *Ae. albopictus* (Skuse) was 1st demonstrated in the continental USA in Texas in 1985 (Sprenger and Wuithiranyagool 1986) and has spread to approximately 38 states (Kraemer et al. 2015, Hahn et al. 2017). *Aedes albopictus* was 1st reported in 1986 in several southern Illinois counties (Stone et al. 2020).

At least 26 arboviruses representing at least 5 different families have been detected in field-collected pools of *Ae. albopictus*, including Jamestown Canyon virus (JCV), CVV, WNV, DENV, CHIKV, EEEV-NA, and LACV (Holick et al. 2002, Gratz 2004, Paupy et al. 2009, Bonizzoni et al. 2013, Westby et al. 2015, Vanlandingham et al. 2016, Eastwood et al. 2020). In addition, laboratory transmission of 26 arboviruses, including WNV, EEEV-NA, and LACV, has been demonstrated in *Ae. albopictus* (Moore and Mitchell 1997, Paupy et al. 2009, Garcia-Rejon et al. 2021). *Aedes albopictus* has been implicated as a vector in human cases of ZIKV infection, with virus having been isolated from both mosquito pools and human sera following contact with infected mosquitoes (Wong et al. 2013, Grard et al. 2014). Human DENV and CHIKV infections in France linked to *Ae. albopictus* have also been described (La Ruche et al. 2010, Delisle et al. 2015).

Beyond larger, metropolitan areas, the monitoring of mosquito populations is lacking. This is particularly true in rural parts of Illinois, due in part to lack of funding and trained personnel in these areas (Moise 2018). The western Illinois region between the Illinois and Mississippi rivers is no exception. To assist local health departments in these rural,

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underserved areas, the Western Illinois University Vector Biology Initiative (WIU-VBI) was established in 2014 and was active until 2019. This group incorporated student-centered vector biology research and service to local health departments.

From 2015 to 2016, *Ae. albopictus* was found in Cass, Fulton, Hancock, McDonough, and Schuyler counties, IL, for the 1st time, highlighting range expansion in west-central Illinois. From 2014 to 2016, *Ae. japonicus* was also discovered for the 1st time in Fulton, Hancock, and Schuyler counties, IL, and confirmed active breeding populations in Cass, Fulton, McDonough, and Schuyler counties (Table 1). Together, these data confirm the establishment of 2 highly invasive mosquito species in west-central IL.

MATERIALS AND METHODS

Studies were conducted in Cass, Fulton, Hancock, McDonough, and Schuyler counties in west-central Illinois in collaboration with local health departments during 2014–18 (Fig. 1). Mosquitoes were trapped using oak-leaf-infusion–baited Frommer Updraft Gravid Traps (John Hock Company, Gainesville, FL). These traps were used in other studies (Falco et al. 2002, Dunphy et al. 2009, Obenauer et al. 2009, Reiskind and Janairo 2018) to trap multiple *Aedes* species; they have also been used to collect *Aedes* and *Culex* species at our study sites in west-central Illinois. The Frommer Updraft Gravid Trap operates in a similar manner to the CDC gravid light trap but has the updraft fan placed above the collection vault. Specimens are therefore not in direct contact with the fan blades during collection, providing specimens that are not damaged by the collection process. Traps were set up during the months of May through October, and male and female *Aedes* mosquitoes were identified to species level (Darsie and Ward 2005, Farajollahi and Price 2013). As a quality assurance/quality control measure, species identification was confirmed by Illinois Department of Public Health (IDPH) entomologists.

Mosquito eggs were also collected from June until October 2017. Germination paper strips were positioned in 250-ml plastic cups painted black on the outside and filled with oviposition fluid (10% oak leaf infusion, 90% water). Oviposition strips were changed weekly and examined under a dissecting microscope for the presence of *Aedes* eggs. Strips were placed in a 0.03% lactalbumin-yeast (1:1) suspension (Muturi et al. 2016), and larvae were reared to adults for identification and confirmation of actively breeding colonies (Swanson et al. 2000, Armistead et al. 2008).

RESULTS

Aedes japonicus

In August 2014, *Ae. japonicus* was captured in Cass County at the Beardstown Sanitary District, confirming previous reports (Jack Swanson, IDPH, personal communication). This site is located approximately 0.5 km south of the Illinois River, with a residential area to the south and west, and wetland to the east (Fig. 1). This species was collected in each annual sampling cycle at this site (2014–18), demonstrating an active breeding population (Table 1 and Fig. 1). Four years later, in 2018, *Ae. japonicus* was captured in Cass County at a nearby heavily wooded city park, indicating the establishment of this invasive species in the area (Table 1 and Fig. 1).

In the late summer of 2014, *Ae. japonicus* was also captured for the 1st time in Fulton County at 2 separate private residences. One residence was located on the west edge of the town of Vermont, with a heavily wooded area approximately 0.5 km to the north and farmland 0.5 km to the east (Fig. 1). The other residence was located near the Fulton and Schuyler County line and consisted of a heavily wooded area adjacent to a former rock quarry pit that had since filled with water and now served as a pond (Table 1 and Fig. 1). This species was also collected every subsequent year in the study (2014–18) from the 2 private residences, demonstrating an active breeding population (Table 1 and Fig. 1).

The 1st record of *Ae. japonicus* in Hancock County occurred in August 2017 at 2 independent sites. One site was the Western Illinois University Alice L. Kibbe Life Science Research Station, a 222-acre field station located on a bluff above the Mississippi River in Warsaw, IL (Table 1 and Fig. 1). The site contains oak-dominated woodlands, hill prairies, and rocky intermittent streams. The second site, the Carthage Highway Department in Hancock County, is bordered by a residential area to the east, a cemetery to the north, cattle stockyards to the west, and a wooded, headwater stream to the south (Fig. 1). In 2018, *Ae. japonicus* was 1st recorded at a trap site at a wastewater treatment plant in Hancock County (Table 1 and Fig. 1).

Aedes japonicus was collected at multiple sites in McDonough County every year throughout this study (2014–18), suggesting an established breeding population (Table 1). McDonough County sites, including a high school, a university, a private residence, a private horse barn, and a wastewater treatment plant, represent a variety of land uses (Fig. 1). In Schuyler County, *Ae. japonicus* was 1st collected in August 2015 at a golf course and was also collected in 2016, 2017, and 2018, again suggesting an active breeding population (Table 1 and Fig. 2). No adult *Ae. japonicus* were successfully reared from collected eggs from any site during this study.

Updates in *Ae. japonicus* distribution records in the state of Illinois for the years 2014 through 2018 are shown in Fig. 2. These include records reported by both the Illinois Department of Public Health (IDPH) and the Illinois Natural History Survey (INHS). The expansion in *Ae. japonicus* distribution knowledge, including actively breeding populations, in west-central Illinois as a direct result of the effort

Table 1. Site description and 1st record year and recorded active breeding years of *Ae. japonicus* and *Ae. albopictus* in multiple counties in west-central Illinois in 2014–18.

Site	County	Site Description	*Aedes japonicus* records		*Aedes albopictus* records	
			1st record year	Active breeding population year(s) records	1st record year	Active breeding population year(s) records
H1	Hancock	Western Illinois University's Alice L. Kibbe Life Science Research Station; oak-dominated woodlands; hill prairies; rocky intermittent streams	2017	–	2017	–
H2	Hancock	Private residence by man-made pond; adjacent to farmland and a lowland hardwood swamp	–	–	2017	–
H3	Hancock	Waste water treatment plant	2018	–	–	–
H4	Hancock	Highway department site; residential area to east; cemetery to north, cattle stockyards to the west; wooded, headwater stream to the south	2017	–	2018	–
M1	McDonough	Horse barn by small pond; surrounded by wooded areas	2014	2015-2018	–	–
M2	McDonough	Public high school athletic field; surrounded by residential areas	2014	2015-2018	–	–
M3	McDonough	Swamp at University; adjacent to campus buildings and residential areas	2014	2015-2018	–	–
M4	McDonough	Private, wooded residence	2014	2015-2018	2016	2017-2018*
M5	McDonough	Waste water treatment plant; adjacent to residential areas and wooded area	2014	2015-2018	–	–
S1	Schuyler	High school field; surrounded by wooded area and residential area; adjacent to refuse area	–	–	2017	–
S2	Schuyler	Golf course near pond; surrounded by wooded area and residential area	2015	2016-2018	–	–
F1	Fulton	Private residence at west edge of town of Vermont, IL; heavily wooded area ~0.5 km south; farmland ~0.5 km east	2014	2015-2018	–	–
F2	Fulton	Private residence in heavily wooded area; directly adjacent to former rock	2014	2015-2017	–	–
F3	Fulton	Canton, IL; Private residence	–	–	2016	–
C1	Cass	~0.5 km south of Illinois River; residential area to south and west;	2014	2015-2018	–	–
C2	Cass	Swampland	–	–	–*	–
C3	Cass	Heavily wooded city park; residential area to the east; swamp and farmland to the west	2018	–	2016	2017-2018*

* Indicates that *Ae. albopictus* adults were successfully reared from eggs collected at this site in 2017.

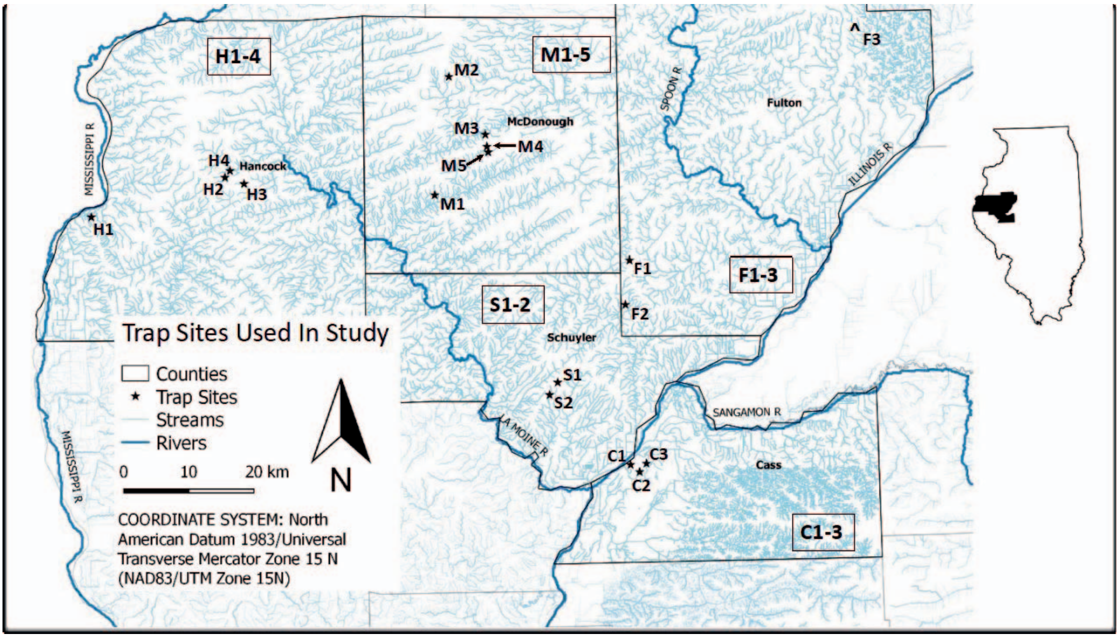

Fig. 1. Mosquito trap site locations in west-central Illinois utilized during this study. The location of mosquito trap sites (represented by stars) within a total of 5 counties in west-central Illinois that were utilized throughout our study are shown in the map above. The location of each of 4 study sites in Hancock County, IL (H1-4), 5 sites in McDonough County, IL (M1-5), 2 sites in Schuyler County, IL (S1-2), 2 sites in Fulton County, IL (F1-2), and 3 sites in Cass County, IL (C1-3) are noted on the map. Site F3 in Fulton County is noted by a carat and represents the location of an *Aedes albopictus* sample that was submitted to the WIU-VBI by a private citizen in 2016. Oak-leaf-infusion–baited Frommer Updraft Gravid Traps were used at each site throughout the study. Traps were set up and serviced during the months of May through October. Mosquito eggs were also collected from each site during the months of June through October in the 2017 study season.

of the WIU-VBI is further highlighted in the enlarged panel in Fig. 2.

The annual mean number of *Aedes* spp. per trap by county (Table 2) varied between year to year even within the same county. Interestingly, Fulton County consistently yielded the highest numbers of *Aedes* spp. per trap each year throughout the study of any county sampled. This trend is also evidenced in Fig. 3A, which shows more than 25% of the total mosquitoes captured were *Aedes* spp. in Fulton County for the last 3 years of the study (2016–18). McDonough County, which is adjacent to Fulton County, had the next highest percentage of *Aedes* spp. of total mosquitoes captured throughout the study (Fig. 3A). *Aedes japonicus* was the most abundant *Aedes* sp. represented in collections during the 2015 and 2016 field seasons across all 5 counties (Fig. 3B). However, *Ae. japonicus* was present in all 5 counties sampled during each year of the study (Fig. 3B). Other *Aedes* spp. of note collected during our study included *Ae. triseriatus* (Say) (commonly collected throughout the study at all sites), *Ae. vexans* (Meigen), occasionally collected throughout study at select sites), and on 1 occasion, at 1 site, an *Ae. trivittatus* (Coquillett) specimen.

Aedes albopictus

In Cass County, *Ae. albopictus* was 1st collected from a park in Beardstown, IL, in July 2016. The park was bordered by a residential area to the east and swamp and farmland to the west (Fig. 1 and Table 1). Subsequent collections from this and other sites in 2017 and 2018 provided evidence of an active breeding population (Table 1). In addition, 2 male *Ae. albopictus* adults were reared from eggs collected from the park on September 19, 2017. Eggs collected from swampland bordering the Cass County Public Health building on October 10, 2017, bore 5 female and 8 male *Ae. albopictus* adults. The 1st record of *Ae. albopictus* in Fulton County was the result of a public outreach seminar on mosquito control. A concerned citizen from Canton, Illinois, recognized the invasive mosquito and submitted samples to the WIU-VBI laboratory in August 2016 (Table 1). However, no *Ae. albopictus* adults or eggs were collected at our other Fulton County study sites that could confirm active breeding populations.

In Hancock County, a private residence was the 1st site of *Ae. albopictus* capture in September 2017 (Table 1). The residence included a man-made pond and was bordered by farmland and a lowland hardwood swamp. This 1st record was soon followed

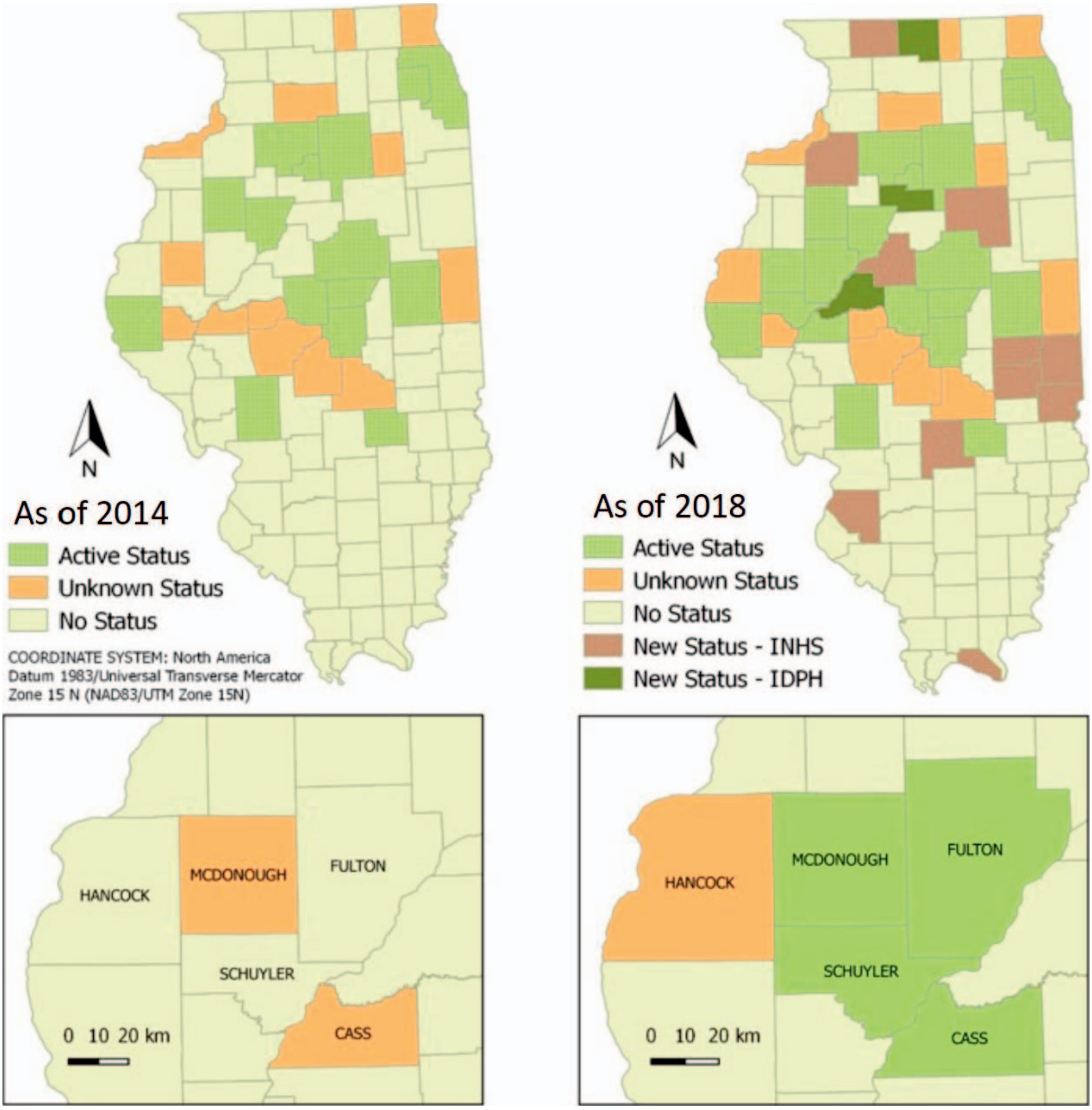

Fig. 2. *Aedes japonicus* distribution in Illinois, 2014–18. For the sake of completeness, collection data reported to the Illinois Department of Public Health (IDPH) are included (Jack Swanson, IDPH, personal communication). "New Status—INHS" represents new *Ae. japonicus* records reported by Changhyun Kim of the Illinois Natural History Survey (INHS). "New Status—IDPH" represents new *Ae. japonicus* records reported by Jack Swanson of the IDPH.

by an additional 1st capture in September 2017 of *Ae. albopictus* at the Western Illinois University Alice L. Kibbe Life Science Research Station (Table 1). *Aedes albopictus* was then captured for the 1st time at a highway department site in Hancock County in 2018 (Table 1). We were unable to confirm breeding populations of *Ae. albopictus* in Hancock County during this study period.

Beginning in August 2016 and continuing to August 2018, *Ae. albopictus* was collected at a private residence in the town of Macomb in McDonough County (Table 1). Additionally, 8 female and 6 male *Ae. albopictus* adults were reared from eggs collected on September 26, 2017, from this same residence, indicating a breeding population. *Aedes albopictus* was 1st trapped in Schuyler County at a public high school in Rushville, IL, in August 2017 (Table 1). This site was surrounded by a wooded area and a residential area and was adjacent to a refuse center (Fig. 1 and Table 1). Breeding populations of *Ae. albopictus* in Schuyler County were not confirmed during this study.

Updates in *Ae. albopictus* distribution records in the state of Illinois for 2014 through 2018 are shown

Table 2. Annual county breakdown of *Aedes* spp. collected per trap in west-central Illinois in 2014–18.

County	2014	2015	2016	2017	2018
	Aedes/trap	*Aedes*/trap	*Aedes*/trap	*Aedes*/trap	*Aedes*/trap
Cass	5	10	47	37	21
Fulton	45	447	342	300	80
Hancock				36	16
McDonough	39	47	24	41	38
Schuyler		2	3	25	0

in Fig. 4, including counties with actively breeding populations. These include records reported by both the IDPH and the INHS. The contribution of the WIU-VBI is highlighted in the enlarged panel in Fig. 4.

Aedes albopictus was not present at any of our study sites until the 2016 trapping season (Fig. 3B) when it was discovered at a trap site in Cass County and at a separate trap site in McDonough County (Table 1). Subsequently, active breeding populations were documented at these 2 sites (Table 1). *Aedes albopictus* remained a portion of the captured *Aedes* spp. during the 2017 and 2018 mosquito seasons (Fig. 3B) and was captured in multiple counties in west-central Illinois, including Cass and McDonough counties (Table 1).

DISCUSSION

A thorough survey of the presence and abundance of invasive mosquitoes has never been conducted before in west-central Illinois. The preceding results chronicle 1st records of both *Ae. albopictus* and *Ae. japonicus* in Cass, Fulton, Hancock, McDonough, and Schuyler counties. These studies have demonstrated a more than 3-fold increase in the total percentage of *Aedes* spp. collected from 2014 to 2016 (Fig. 3B). This was largely due to the substantial increase in the percentage of *Ae. japonicus* collected, particularly from 2014 to 2015. While other *Aedes* spp. remained consistent in percentage throughout the study, the percentage of *Ae. japonicus* and *Ae. albopictus* fluctuated by year. The reason for this is unclear but could be related to several factors, including precipitation levels, which would directly impact water levels in rock pools along river corridors. Due to the extensive use of these rock pools as oviposition sites by both *Ae. japonicus* and *Ae. albopictus*, the use of river corridors as a means for population expansion throughout west-central Illinois is possible for both species. Given the proximity of our sample sites to the Illinois and Mississippi rivers and the implied role of river corridors in the active expansion of both *Ae. japonicus* and *Ae. albopictus* (Bevins 2007), this may account for the establishment of new mosquito populations in counties along the Illinois River.

As this was a multiyear study, in addition to recording 1st record data for several west-central Illinois counties, we were able to identify and confirm active breeding populations in some of these counties as well (Table 1). This indicated that at least some of the *Aedes* populations could have been established in these areas prior to our work. A recent study that analyzed the genetic diversity between *Ae. albopictus* populations across the state determined that repeated introductions comprised the vast majority of *Ae. albopictus* introductions and spread throughout the state of Illinois (Stone et al. 2020). These introductions could have included the diffusion of existing populations of mosquitoes from neighboring states and counties, mosquitoes from existing populations in nonadjacent counties and states elsewhere in the United States, or populations introduced directly from their native Japan. However, this study also indicated that although more recent *Ae. albopictus* population spread in southern and central Illinois was only partially due to localized dispersal mechanisms and localized overwintering, these mechanisms of spread were becoming more and more frequent in recent years (Stone et al. 2020).

Aedes albopictus and *Ae. japonicus* are both highly adaptable to temperature change, with *Ae. japonicus* being particularly tolerant to cold temperature. Both species can adapt to seasonal temperature variations in many climates by utilizing diapause, thus allowing for a period of seasonal dormancy (Bonizzoni et al. 2013, Krupa et al. 2021). Range expansion of *Ae. albopictus* latitudinally northward is limited in part because of its requirement for more

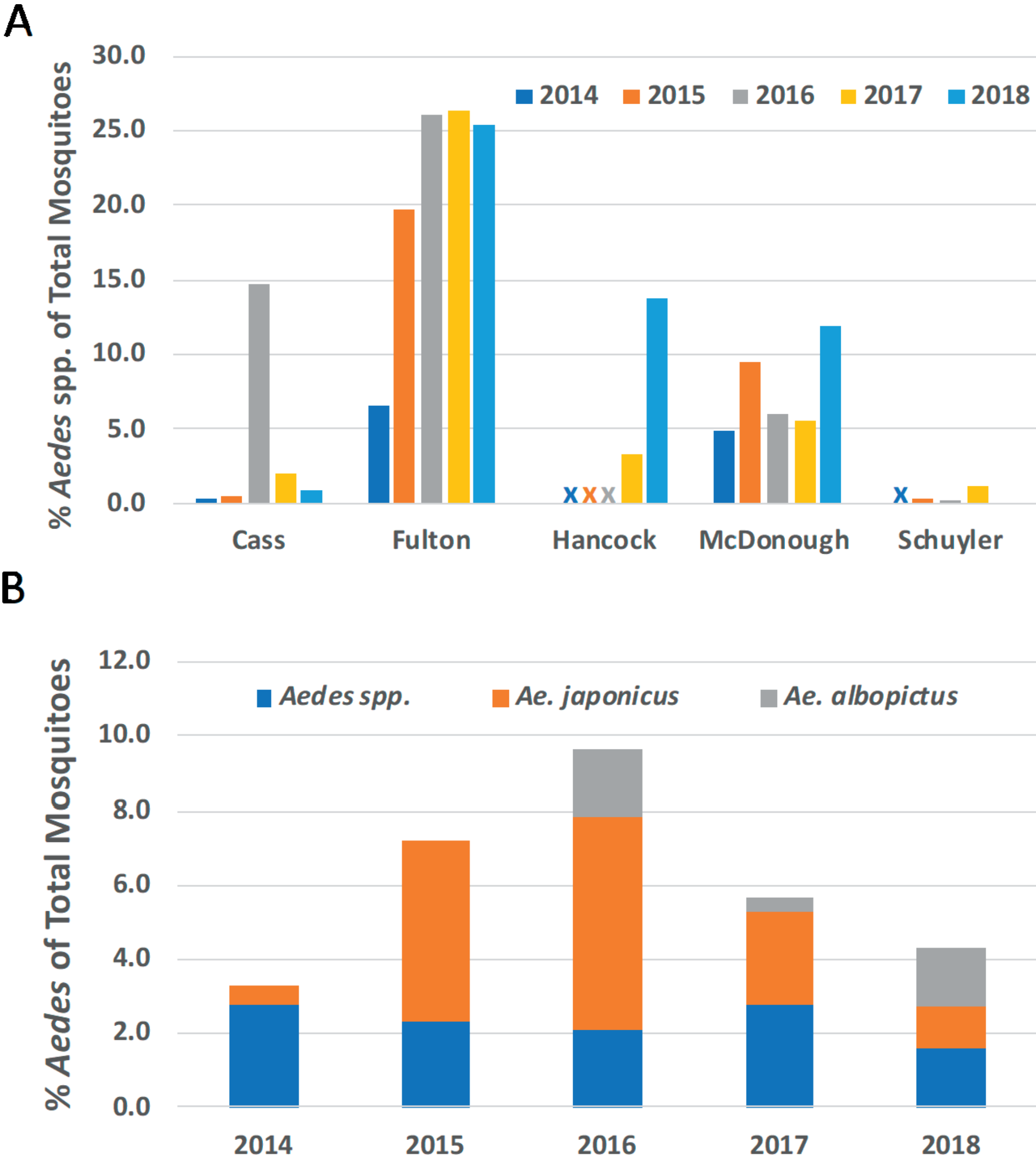

Fig. 3. Percent *Aedes* spp., *Ae. japonicus*, and *Ae. albopictus* mosquitoes of total mosquitoes captured in Illinois, 2014–18. (A) Percent *Aedes* spp. of total mosquitoes collected by county by year. "% *Aedes* spp." includes *Ae. japonicus* and *Ae. albopictus* collected. "x" = County not sampled for that year. (B) Percent of *Aedes* spp. captured that were identified as *Ae. japonicus*, *Ae. albopictus*, or another, noninvasive *Aedes* spp.

moderate winters (Armstrong et al. 2017), whereas range expansion of *Ae. japonicus* latitudinally southward is limited because of the requirement for a colder climate (Kaufman and Fonseca 2014). As such, the cold and heat tolerances of *Ae. japonicus* (Fig. 2) and *Ae. albopictus* (Fig. 4), respectively, are clearly noticeable in our updated records maps.

As a result of climate change, *Ae. japonicus* and *Ae. albopictus*, among other invasive mosquito species, will continue to broaden their geographic range. Shorter and warmer winters in more temperate areas, like west-central Illinois, may further foster unintended interactions between *Ae. albopictus*, *Ae. japonicus*, and native *Aedes* spp. as well as other native Illinois mosquito species. Although the study

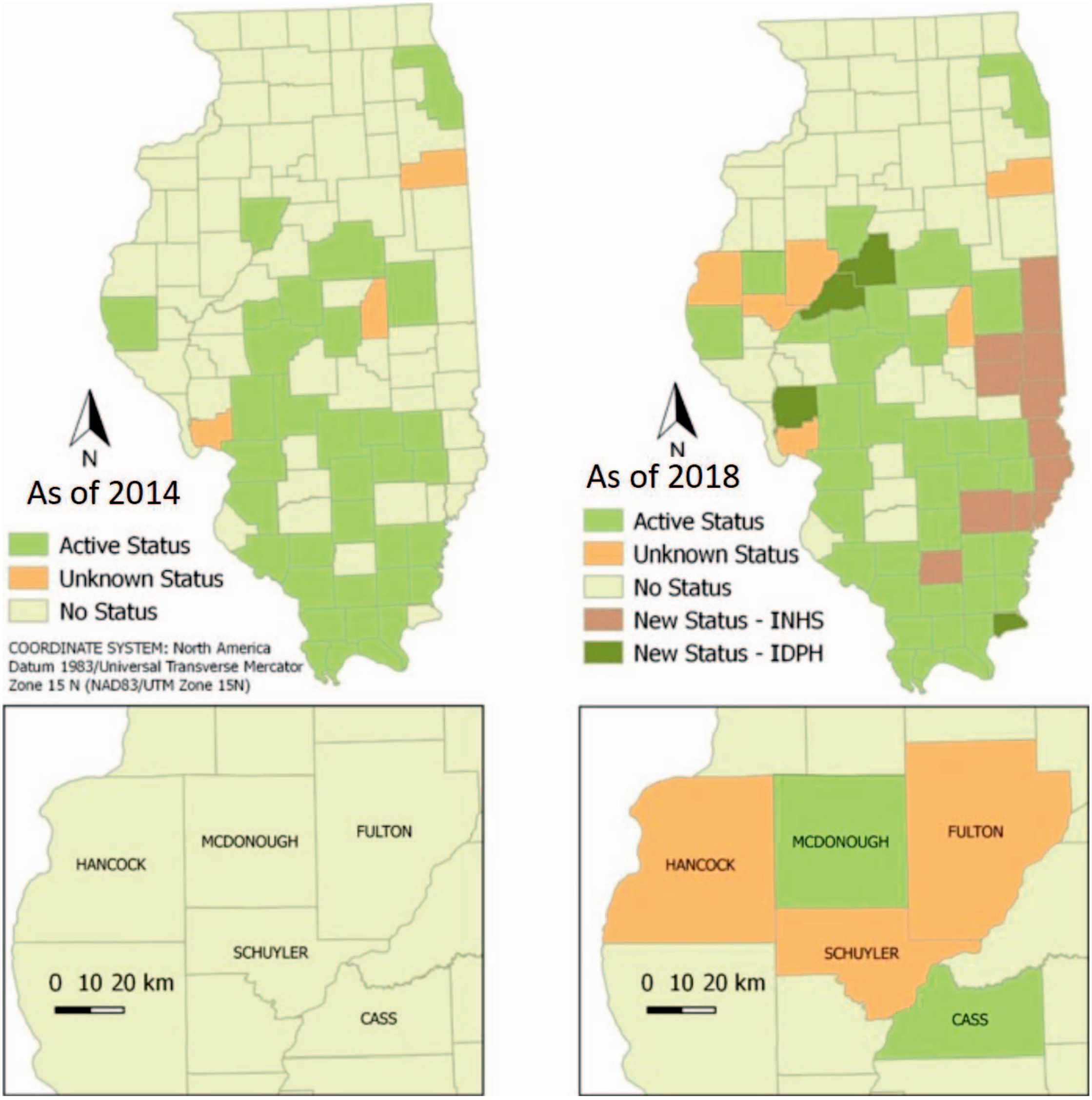

Fig. 4. *Aedes albopictus* distribution in Illinois, 2014–18. For the sake of completeness, collection data reported to the Illinois Department of Public Health (IDPH) are included (Jack Swanson, IDPH, personal communication). "New Status—INHS" represents new *Aedes albopictus* records reported by Changhyun Kim of the Illinois Natural History Survey (INHS). "New Status—IDPH" represents new *Ae. albopictus* records reported by Jack Swanson of the IDPH.

sites varied substantially by land-usage type and included wetlands, farmland, heavily forested areas, hill prairies, and a public golf course, multiple sites consistently contained both *Ae. albopictus* and *Ae. japonicus* within the same trap simultaneously throughout the entire study period (Table 1). Therefore, it is plausible that at some point during their life cycle, *Ae. albopictus* and *Ae. japonicus* may interact directly with each other and with native mosquito species. Interestingly, following the appearance of *Ae. albopictus* in 2016, the percentages of *Ae. japonicus* collected at our sites in the following 2 years (2017 and 2018) began to steadily decline (Fig. 3B). One possibility could be competition between the invasive and native *Ae*. spp. at the larval stage.

It is known that *Ae. albopictus* successfully outcompetes native *Aedes* spp. during the larval stage, including *Ae. triseriatus*, a known vector for LACV (Juliano and Lounibos 2005). *Aedes japonicus* is not a strong direct larval competitor but appears to have a developmental speed advantage over most native species, thus allowing it to reach adulthood more quickly (Moore 1999, Juliano and Lounibos 2005). Stresses in the larval environment, including competition from other mosquito larvae, have been shown to increase the ability for viral transmission in competent adults that emerge from such environments (Alto et al. 2005, Muturi et al. 2011). This is evident in larval habitats coinhabited by *Ae. albopictus* and *Ae. triseriatus* where adult *Ae. triseriatus* that emerge from this habitat have been shown to be more efficient vectors of LACV (Bevins 2008a, 2008b). As *Ae. triseriatus* was consistently present at all sites sampled throughout the duration of this study, it is possible that competition on some level between native and invasive *Aedes* spp. is occurring at our study sites.

La Crosse virus is the leading cause of arboviral encephalitis in the USA in school-aged children, and it is believed that LACV-related neuroinvasive disease cases are substantially underreported and underdiagnosed each year in the USA (McJunkin et al. 2001). Field-collected specimens of *Ae. albopictus*, *Ae. japonicus*, and *Ae. triseriatus* have been shown to be naturally infected with LACV in the state of Tennessee, raising the possibility that *Ae. albopictus* and *Ae. japonicus* could serve as bridge vectors for LACV in this location (Gerhardt et al. 2001, Westby et al. 2015, Harris et al. 2015, Bewick et al. 2016). Although *Ae. japonicus* is not considered a major vector of human pathogens throughout the world, it has been implicated in Japanese encephalitis virus (JEV) outbreaks in its native Japan (Takashima and Rosen 1989). Future increased interactions, including habitat and/or resource competition at the larval stage, between native and invasive *Aedes* spp. may impact the ability of these mosquitoes to harbor and then transmit region-specific viral pathogens like LACV to humans.

As adults, *Ae. albopictus* exhibit, and prefer, anthropophilic behavior and are highly aggressive opportunistic day feeders, whereas *Ae. japonicus* feeds primarily on mammals other than humans in its native range (Apperson et al. 2004, Kaufman and Fonseca 2014). However, *Ae. japonicus* is fully capable of utilizing the human host in their its and expanded ranges (Apperson et al. 2004, Molaei et al. 2009, Kaufman and Fonseca 2014). Although WNV has been found in field-collected *Ae. japonicus* adults, implying that an avian blood meal has been taken, direct evidence of avian blood meals in field *Ae. japonicus* is minimal to date (Turell et al. 2001, Kaufman and Fonseca 2014, Cebrián-Camison et al. 2020). Understanding and monitoring avian and mammalian feeding habits of *Ae. japonicus* may be key to understanding the potential risk associated with many of these arboviruses to the human population.

With the recent emergence and reemergence of a wide array of arboviral diseases, mosquito surveillance has become increasingly vital for public health. As both *Ae. japonicus* and *Ae. albopictus* harbor a plethora of viral pathogens, monitoring the extent of their invasion throughout the USA and the world is crucial for public health considerations.

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