PRESENCE OF *AEDES ALBOPICTUS* in Palestine –West Bank

Shadi Hilmi Abd Allah Adawi1

Ministry of Health, Salfit Primary Health Care, Environmental Health Department, Palestinian Territory.

ABSTRACT

Aim: This study was conducted in order to proven the presence of *Aedes (stegomyia) Albopictus* (Sukse,1895) and provide information about its distribution during the period (July to October of 2012) in Salfit district (Northwestern West Bank).

Study Design: A cross sectional study.

Methods: entomological survey was done in West Bank - Salfite district to collect Larvae and adults of *Aedes albopictus* Mosquitoes from different localities of Salfit district during the period (July to October of 2012).

Results: adults mosquito of *Aedes albopictus* was found and collected from out site the gardens of houses in tow locality in salfit district for the first time(Mas-ha and Az-Zawia locality) and Different immature stages (Larvae and pupae) of mosquito were found in one locality in salfit district(Mas-ha locality)

Limitations of Study: This study discuss the presence and distribution of *Aedes albopictus* in Salfit district during the period (July to October of 2012).

Conclusion: The results show that the dense populations of adults and Larvae were found in subsequent survey, confirming the establishment of the species in the area.
More studies are needed to understand the ecology and biology of Aedes albopictus and its distribution in Salfit district and it possibility in transmitted virus diseases

Keywords: Aedes albopictus; Salfit district; presence; distribution.

1. Introduction:

The mosquitoes *Aedes* (stegomyia) *Albopictus* (Sukse,1895) which notorious as the Asian Tiger Mosquito, has been spreading world wild during the past two decades and has been reported in more than 25 countries on the five continents outside its natural region since the end of 1970.(Gratz,2004.,Benedict *et al*.,2007)

Aedes Albopictus originally widespread in Southern Asia and Island of Western Pasific and Indian(Belkin,1962) in recent decades its also spread in north and south America, Ausralia, Newzealand, Africa and Europe countries such as(France, Italy and Spin).(Aranda et al.,2006;Toto et al.,2003; Schaffner and Karch,2000). And its also spread in Mediterranean region such as (Lebanon, Syria and Israel country which nearest to the West Bank with few Kilometers distance.(Pener et al.,2003; Haddad et al.,2007).

UNDER PEER REVIEW

Aedes albopictus is highly invasive mosquito species and difficult to control, also its aggressive day – time, which considered a container breeder preferring to oviposition in small quantities of water such as drums, tiers, buckets, flower saucers, tarpaulins and manholes and trees hole(Carrieri et al., 2003;Toto et al.,2003; Aranda et al., 2006) .

In addition to nuisance biting *Aedes albopictus* its posses a potential threat to human health ,its known to be a vector of several arboviruses in Africa, Asia, Europe, it has been found infected with the following viruses Dengue fever, Chikugunga fever, Encephalitis, West Nile fever, Rift valley fever (Mitchell,1995; Gratz,2004; Enserik,2008; Haddad et al., 2007).

Many studies have proved that the *Aedes albopictus* it's the main vector for Dengue and West Nile fever and Rift Valley fever in different countries such as Egypt, Yemen, Saudi Arabia, and Israel) (Weinberger et al .,2001; Mandani et al.,2003; Pener et al.,2003; Tureel et al 2002; Haddad et al., 2007).

Many studies discussed the presence of *Aedes albopictus* in different countries(Lebanon, Syria, Yemen, Saudi Arabia and Israel), also study the ecology, biology and its medically importance in transmitting diseases (Weinberger et al., 2001; Mandani et al.,2003; Pener et al.,2003;Tureel et al., 2002; Haddad et al., 2007).

In Palestine- West Bank ministry of health report sign that anew species of mosquito (*Aedes albopictus*) spread in a few sporadic foci in different Districts of West Bank without any details (MOH, 2012). there is no studies discussed the presence of *Aedes albopictus* ,its biology, ecology, distribution and it's medical importance before, because this species hasn't been record in Palestine – West Bank before the year of 2012.

So in order to prove the presence of this species in West Bank and to provide information about its distribution and its breeding sites this study was conducted.

2. Material and Methods:

2.1. Study area:

Salfit district located at 32° 7′ 5.5″ N, 35° 5′ 25″ E (figure. 1) with total area is almost 202 sq km. It is one of 17 districts of the Palestinian National Authority, it is located in the northwestern West Bank, bordered by the district of Ramallah and al-Bireh to the South, Nablus to the East, and Qalqilya to the North as well as Israel to the West. According to the Palestinian Central Bureau of Statistics (PCBS), 2007 the governorate has a population of 59,570 inhabitants most of whom work in agriculture and trade. Economic activity depends on agriculture, where olives, almonds, figs, grapes, and apples are the main crops. It has a hot climate, dry summers and rainy winters, and has the average maximum temperature 29 degrees Celsius, while the average minimum temperature amounts to 6 degrees Celsius. The average humidity in the region is 62% that may rise up to 6[illegible]. Rainfall concentrates in winter and the average rainfall is 660 mm per year. In some years the rainfall can reach 1000 mm, as reported in 1981

2.2. Methods:

From July 2012 until October 2012 Entomological survey was conducted in West Bank – Salfit district to collect larvae and adults of suspected *Aedes albopictus* Mosquitoes from different localities based on the continuous complaints from the residents who suffer from an aggressive mosquito biting during the day and has colors(black and white) and didn't notice before in this areas.

2.3. Adults and larvae collecting:

During the survey adults and larvae mosquito were collected by landing catches during the day for adults and by handling for the larvae from different habitat in rural and vegetation areas from tow localities in Salfit district (Mas-ha and Az-Zawia locality)

UNDER PEER REVIEW

2.4. Adults and larvae identification:

Collecting of adults and larvae mosquito were sent to the lab in Slafit Primary Health Care Center for identification by using morphological key, using dissecting microscope

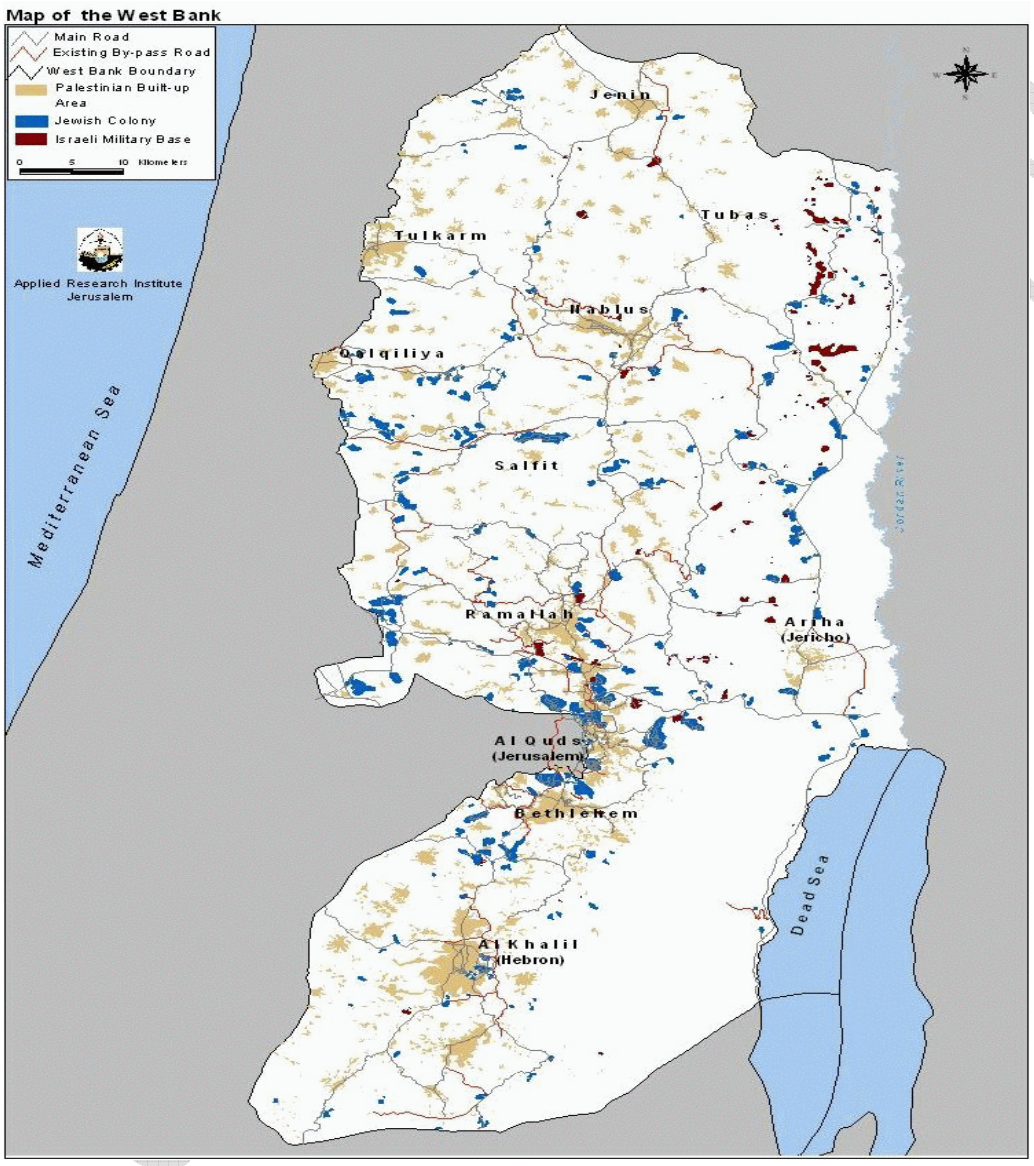

Figure 1. shows the located of Salfit district in the West Bank (palestine Central Bureau of statisti, 2007)

3. RESULTS:

3.1Collecting Adults and larvae from different habitats and studying its distribution in Salfit district

During the period of entomological survey adults mosquito was found and collected from out site the gardens of houses in tow locality in salfit district (Mas-ha and Az-Zawia locality) which have vegetation and ornamental plants and different kinds of trees by landing catches during the day for adults and handling for larvae. Different immature stages (Larvae and pupae) of mosquito were found in one locality in salfit district(Mas-ha locality), the mosquito was never found in any other localities during the survey period , the breeding sites for immature stages were plastic containers of water(200L) used for plant irrigation in nursery.

3.2 Adults and larvae of *Aedes Albopictus* identification

All Adults and larvae mosquito was *Aedes Albopictus* and identified by using morphological keys (Leopoldo, 2004.,Darsie,1986., Shahyard and Rai,2009).

4. Discussion :

Aedes Albopictus is a widespread mosquito and it plays a role in transmitting diseases in neighboring countries (Syria, Lebanon, Egypt and Israel). (Pener et al.,2003; Haddad et al., 2007; Weinberger et al .,2001; Mandani et al.,2003; Tureel et al., 2002). Many studies discussed the presence, distribution, biology , ecology and medical importance of this species especially in Israel which is a closed Palestine country and where share borders in all districts ,so the transmition of *Aedes Albopictus* to Palestine - West Bank is possible by different ways, it can be transported in vehicles, trading, especially ornamental plants, trees (fruits, citrus, etc) these ways are suitable habitat for breeding and resting of *Aedes Albopictus*. this hypothesis agrees with different studies like (Pener et al.,2003; Klobucar et al., 2006) which suggests that the *Aedes Albopictus* was transmitted by vehicles transportation. (Mondon et al.2002, 2004 was found that the immature stages of mosquito was transmitted by ornamental plant and trees sent to California and Netherlands.

In Salfit district especially in Mas-ha and Az-Zawi locality it's expected that the presence of *Aedes Albopictus* is due to transport or trading of ornamental plants. Through the entomological survey the results showed that all places have positive *Aedes Albopictus* Adult mosquito they have ornamental plants (flowers) brought from the nurseries located in the neighboring country (Israel) which endemic with *Aedes Albopictus*. The results also showed the presence of immature stages of mosquito in one place (nursery) in Mas-ha locality from salfit district, Through the investigations with the owner of this nursery, the results showed that all plant (ornamental plants , trees plant) coming from endemic area in Israel .this results agree with other studies as (Mondon et al.,2002,2004) which proved that immature stages of mosquito transmitted through trading of ornamental plants and trees coming from endemic country with *Aedes Albopictus*

5. Conclusion:

The results show that the dense populations of adults and Larvae were found in subsequent survey, confirming the establishment of the species in the area.
More studies are needed to understand the ecology and biology of *Aedes albopictus* and its distribution in Salfit district and it possibility in transmitted virus diseases.

ACKNOWLEDGEMENTS

I am grateful to the Director of primary health care center in Salfit district Dr. Jamil Draghmah for his support, comments and encouragement during this work. I am also gratefully thanking the head of environmental health department Mr. Abd Al –Kareem Bolad and his staff for their efforts. Finally I am also grateful to Dr. Yasser Buzzia for his encouragement.

COMPETING INTERESTS

Author has declared that no competing interests exist.

UNDER PEER REVIEW

REFERENCES:

Aranda, C., Eritja, R., Roiz, D. (2006). First record and establishment of *Aedes albopictus* in Spain. Medical and Veterinary Entomology, 30,150-52.

Belkin, J.N.(1962). The mosquitoes of the South Pacific (Diptera, Culicidae). Volumes 1 and 2. Berkeley and Los Angeles: University. of California Press.

Benedict, M.Q., Levine, R.S., Hawley, W.A., Lounibos, L. P. (2007). Spread of the tiger: global risk of invasion by the mosquito *Aedes albopictus*, Vector-Borne Zoonotic Diseases,7,76-85.

Carrieri, M., Bacchi, M., Bellini, R., Maini, S. (2003). On the competition occurring between *Aedes albopictus* and Culex pipiens (Diptera: Culicidae) in Italy. Environmental Entomology, 32, 1313-21.

Darsie, R.F., Samanidou-Voyadjoglou, A. (1997) Keys for the identification of the mosquitoes of Greece. Journal of the American Mosquito Control Association, 13, 247-54.

Enserink, M.(2008). A mosquito goes global. Science Journal, 320, 864–866.

Gratz, N.G. (2004). Critical review of the vector status of *Aedes albopictus*. Medical and Veterinary Entomology. 18, 215-27.

Haddad, N., Harbach, E., Chamat, S., Bouharoun, H. (2007). Presence of *Aedes albopictus* in Lebanon and Syria, Journal of the American Mosquito Control Association, 23, 226-28.

Klobucar, A., Merdic, E., Benic. N., Baklaic, Z., Krcmar, S. (2006). First record of *Aedes albopictus* in Croatia, Journal of the American Mosquito Control Association, 22, 147- 48.

Leopoldo,M.(2004). Pictorial Keys f or the Identification of Mosquitoes(Diptera: Culicidae) Associated with Dengue Virus Transmission ., , Ph.D.

Madani, T.A., Al-Mazrou, Y.Y., Al-Jeffri, M.H., Mishkhas, A.A., Al-Rabeah, A.M., Turkistani, A.M., Al-Sayed, M.O., Abodahish, A.A., Khan, A.S., Ksiazek, T.G., Shobokshi, O. (2003). Rift Valley fever epidemic in Saudi Arabia: epidemiological, clinical, and laboratory characteristics. Clinical Infectious Diseases 37,1084-92.

Madon, M., Mulla, M.S., Shaw, M.W., Kluh, S., Hazelrigg, J.E. (2002). Introduction of *Aedes albopictus* (Skuse) in Southern California and potential for its establishment. Journal of Vector Ecology, 27, 149-54

Madon, M.B., Hazalrigg, J.E., Shaw, M.W., Kluh, S., Mulla, M.S. (2004). Has *Aedes albopictus* established in California? Journal of the American Mosquito Control Association, 19, 298.

Mitchell, C.J. (1995). The role of *Aedes albopictus* as an arbovirus vector. Parassitologia Journal, 37, 109-13.

MOH, (2012). Palestinian Health Information Center, Website, WWW. MOH.PS

Pener, H., Wilamowski, A., Schnur, H., Orshan, L., Shalom, U., Bear, A. (2003) *Aedes albopictus* in Israel. European Mosquito Bulletin, 14, 32.

Schaffner, F., Karch, S. (2000). First report of *Aedes albopictus* (Skuse, 1984) in metropolitan France. Comptes Rendus de l'Académie des Sciences - Series III 323:373–375.

Shahyad, A.H., Ralef, H.(2009). Keys to the adult females and fourth-instar larvae of the mosquitoes of Iran (Diptera: Culicidae) Zootaxa 2078, 1–33

Toto, J.C., Abaga, S., Carnevale, P., Simard, F. (2003) First report of the oriental mosquito *Aedes albopictus* on the West African island of Bioko, Equatorial Guinea. Medical and Veterinary Entomology, 17, 343-46

Turell, M.J., Morrill, J.C., Rossi, C.A., Gad, A.M., Cope, S.E., Clements, T.L., Arthur, R.R., Wasieloski, L.P., Dohm, D.J., Nash, D., Hassan, M.M., Hassan A.N., Morsy, Z.S., Presley, S.M. (2002). Isolation of West Nile and sindbis viruses from mosquitoes collected in the Nile Valley of Egypt during an outbreak of Rift Valley fever. Journal of Medical Entomology, 39,248-50.

Weinberger, M., Pitlik, S.D., Gandacu, D., Lang, R., Nassar, F., Ben David, B., Rubinstein, E., Izthaki, A., Mishal, J., Kitzes, R., Siegman-Igra, Y., Giladi, M., Pick, N., Mendelson, E., Bin, H., Shohat, T., Chowers, M.Y. (2001). West Nile fever outbreak, Israel, 2000: epidemiologic aspects, Emerging Infectious Diseases journal, 7,686-91.

UNDER PEER REVIEW