PUBLIZIERBARER ZWISCHENBERICHT

A) Projektdaten

Kurztitel:	VectorBorneDiseases
Langtitel:	Consequences of climate change for the spread of invasive vectors and vector borne diseases in Austria (and neighbouring regions).
Programm inkl. Jahr:	
Dauer:	3 years
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Projektgesamtkosten:	186.016€
Fördersumme:	176.715 €
Klimafonds-Nr:	KR14AC7K11954
Zuletzt aktualisiert am:	05.03.2017

B) Projektübersicht

Kurzfassung: Max. 2.000 Zeichen inkl. Leerzeichen Sprache: Deutsch	In Österreich haben sich, zahlreiche invasive Arten festgesetzt. Bei den Stechmücken ist vor allem *Aedes japonicus*, die asiatische Buschmücke zu nennen. Invasive Arten begünstigen die Verbreitung von neuen pathogenen Mikroorganismen wie das West Nil Virus und Vogel-Malaria-Plasmodien. Ziele des Projektes: • Ein über drei Jahre angelegtes Stechmücken-Überwachungsnetz zur Erfassung invasiver Stechmücken-Arten in Österreich • Erkennung neuer human- und tierpathogener Krankheitserreger (z.B. Bunya- und Flavi-Viren sowie verschiedene Parasiten- und Bakterien-Spezies). Dafür werden molekularbiologische Techniken etabliert und entwickelt (DNA Barcoding, MALDI-TOF) Entwicklung gesamtheitlicher Strategien zur Bekämpfung der Ausbreitung von Stechmückenpopulationen in der anthropogen beeinflussten Natur. • Dafür werden auch Stechmücken, Eigelege und Larven gesammelt, um die Anpassung an die Umweltbedingungen und Überwinterungorte zu studieren. Zur Durchführung des Projekts werden vor allem Regionen in Österreich und im näheren Umland Österreichs gewählt, in denen sich in den letzten Jahren invasive Stechmücken Arten festgesetzt haben (Kärnten, Steiermark, Burgenland, Vorarlberg, Ungarn, Slowenien, Italien). Dadurch sollen jene Faktoren erkannt werden, die deren Ausbreitung begünstigen und eine Vorgehensweise zur nachhaltigen Kontrolle und Bekämpfung ausgearbeitet werden.
Executive Summary: Max. 2.000 Zeichen inkl. Leerzeichen Sprache: Englisch	During the last years invasive species were identified in Austria, most notably *Aedes japonicus*. With these species new viral, bacterial or parasitic pathogens have emerged in Austria, e.g. West-Niles Virus or avian malaria-plasmodes. Goals of this project: Establishing an intensified mosquito surveillance system over the next three years in Austria Identification of new and previously never/seldom for Austria reported viral, bacterial or parasitic pathogens (e.g. Bunyavirus, Flavivirus, and bacterial or parasitic pathogens) Establishing molecular biological methods like DNA barcoding and MALDI-TOF analysis Development of holistic strategies to reduce and control mosquito populations within the human-influenced nature.

	Intensive investigation of the lifecycle adaption of invasive mosquitos to the new ecosystems has to be done by collecting samples of different lifecycle stages throughout the year. Primary targets for intensive investigation will be regions prone for invasion by invasive species (Styria, Carinthia, Burgenland, Vorarlberg and adjacent countries like Hungary, Italy and Slovenia). With this strategy we hope to understand environmental parameters responsible for the emergence of invasive species and to develop measures for control of further spread.
Status: Min. ein Aufzählungspunkt, max. 5 Aufzählungspunkte Max. 500 Zeichen inkl. Leerzeichen pro Aufzählungspunkt	• **Insect surveillance** In 2016 24 of 56 investigated places A. japonicus could be found. First isolation of this species was recorded around the districts of Wiener Neustadt, Mattersburg and Eisenstadt. This development underpins the estimation that in 2017 Aedes japonicus will "arrive" in the area in and around of Vienna: Ae. albopictus will furthermore be specifically screened for, as this species is of special public health relevance. In 2016 none of the samples collected could be identified as A. albopictus. • **Genetic typing of eggs, larvae and adults** DNA barcoding has been done in parallel to the MALDI TOF evaluation. Evaluation of both systems using adult Mosquitos, larva and eggs has been successful. A mosquito DNA-Sequence Database and MALDI-TOF Database for 10 to 15 (using eggs, larva and adults) of the most common endemic and invasive mosquito-species is in works. • **Pilot experiments for chemotracking of breeding sites** Field test have been done with a commercially available larvicidal ovitrap which was developed for the control of Aedes (Stegomyia) sp. It is a black polypropylene cup in which pyriproxyfen was incorporate. Using hay infusion as oviposition attractant, these larvicidal ovitraps were evaluated in urban field conditions. The species using the ovitraps were Culex torrentium and C. pipiens biotypes. The ovitraps were evaluated against control cups without pyriproxyfen and no differences were seen. • **Molecular diagnostics of viruses, parasites and other pathogens in collected samples** Samples collected within this study and from our sample collection have been tested for the presence of flavivirus using a method developed by Patel et al (Virol J. 2013). This method gave one positive result (a virus with 70% genetic similarity to Shuangao fly virus and to Wuhan mosquito virus). Screening for West-Nile-Virus so far yielded negative results, underlining the need for a more sensitive screening method. Tests for bacteria are ongoing. • **Polyspecific whole genome sequencing approach to detect new agents/viruses** Screening results for Flavivirus within Austrian Mosquito—

	sample-pools (n=454) collected 2016 showed no definitive results for members of the Flavivirusfamily. An method to increase sensitivity is in first stage process. An array of various cell lines will be incubated with mosquito samples and incubated. Molecular biological testing of suspected positive cell cultures increases sensitivity due to virus enrichment.
Wesentliche (geplante) Erkenntnisse aus dem Projekt: Min. ein Aufzählungspunkt, max. 5 Aufzählungspunkte Max. 500 Zeichen inkl. Leerzeichen pro Aufzählungspunkt	Project Aims • Analysis of the distribution and presence of invasive mosquito species in Austria and the border regions of neighbouring countries • Investigation on the presence of "tropical" pathogens within the autochthones mosquito population and associated environment in Austria • Evaluation within the community on the level of awareness regarding invasive mosquitos, there impact on daily live, vector born disease and methods of prevention • Screening for pathogens (viral, bacterial and parasitic) in collected mosquitos Publications/Posters/Talks • Seidel B, Nowotny N, Bakonyi T, Allerberger F, Schaffner F. Spread of Aedes japonicus japonicus (Theobald, 1901) in Austria, 2011-2015, and first records of thesubspecies for Hungary, 2012, and the principality of Liechtenstein, 2015.Parasit Vectors. 2016 Jun 24;9(1):356. doi: 10.1186/s13071-016-1645-8. PubMed PMID: 27343074; PubMed Central PMCID: PMC4919864. • Seidel B, Montarsi F, Huemer HP, Indra A, Capelli G, Allerberger F, Nowotny N.First record of the Asian bush mosquito, Aedes japonicus japonicus, in Italy: invasion from an established Austrian population. Parasit Vectors. 2016 May 16;9(1):284. doi: 10.1186/s13071-016-1566-6. PubMed PMID: 27184024; PubMed Central PMCID: PMC4869290. • In submission: "Field evaluation of a plastic pyriproxyfen-incorporated larvicidal ovitrap for the control of urban populations of Culex pipiens sensu lato (Diptera: Culicidae) Journal: Journal of Medical Entomology Manuscript ID Draft Manuscript Type: Research Article, Authors: Jeremy V. Camp, Héctor Masuh, Eduardo Zerba, Alexander Indra, and Norbert Nowotny