

RISK OF THE FALL ARMYWORM (SPODOPTERA FRUGIPERDA J.E. SMITH) ENTERING UZBEKISTAN: PHYTOSANITARY RISK ANALYSIS

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ABSTRACT

The thesis assesses the risk of introduction of the fall armyworm (*Spodoptera frugiperda*), one of the world's most damaging invasive pests, into Uzbekistan using a pest risk analysis (PRA) approach. After its first outbreaks in Africa in 2016, where potential maize losses were estimated at 8.3–20.6 million t per year in 12 countries, the pest spread across Asia and was recorded in Türkiye in 2022 and in Kerman province of Iran in 2023. It has not been recorded in Uzbekistan and is listed as an absent quarantine pest in the national list and in the EAEU list. A MaxEnt model identified southern parts of Central Asia, including the Jizzakh area of Uzbekistan, as climatically suitable. Because the species has no diapause and develops from about 12 °C, the main risk for Uzbekistan is seasonal summer invasion of irrigated maize through migration rather than year-round establishment. The thesis proposes a pheromone-trap early warning network in southern and border regions, training in identification according to EPPO PM 7/124, stricter inspection of produce from southern neighbours, and a country-specific CLIMEX risk model.

Keywords: fall armyworm, *Spodoptera frugiperda*, pest risk analysis, invasive species, quarantine, climate model, migration, surveillance, maize INTRODUCTION

1. INTRODUCTION

The fall armyworm (*Spodoptera frugiperda*) is a polyphagous pest native to the Americas that caused its first large-scale outbreaks in West and Central Africa in early 2016 [1]. In the absence of control, annual maize losses in 12 African countries have been estimated at 8.3–20.6 million t, i.e. 21–53% of production, equivalent to 2.48–6.19 billion US dollars [2]. The pest subsequently spread to India, Southeast Asia, China, Pakistan and Australia [3].

The aim of this study is to assess the likelihood of entry, the establishment potential and the possible consequences of *S. frugiperda* for Uzbekistan on the basis of pest risk analysis (PRA) principles, and to substantiate preventive measures.

2. MAIN PART

Likelihood of entry. The pest is steadily approaching Uzbekistan: it was recorded on maize in Adana province of Türkiye in 2022 [4] and in Kerman province of Iran in October 2023 [5]. Adult moths can fly up to 100 km in a single night, larvae and pupae may be carried with fruit and vegetable consignments, and eggs and adults with means of transport [3]. Natural migration and trade routes are therefore the main pathways of entry.

Establishment potential. Using a MaxEnt model built on 1,314 occurrence records and six climatic variables (AUC 0.834–0.865), Baloch et al. (2020) identified southern Kazakhstan, southern Turkmenistan, western Afghanistan, western Kyrgyzstan and central Tajikistan as suitable for the pest, while in Uzbekistan the Jizzakh area was indicated as suitable [6]. The species has no diapause; its development starts at about 12 °C, and the optimum temperature is 26–30 °C [3]. An analogous study for China showed that winter cold restricts year-round reproduction to the southern regions, whereas further north summer migration creates a seasonal risk [7]. These findings suggest that the main risk for Uzbekistan is seasonal invasion of irrigated maize and sorghum during summer.

Regulatory status and control measures. *S. frugiperda* is included in Uzbekistan's 2022 list of quarantine pests among those absent from the country (item 71) [8] and is also listed in the Unified List of the Eurasian Economic Union (EAEU) as a quarantine pest absent from the Union's territory [9]. For maize, the recommended action threshold during the first 30 days is 5% of seedlings cut or 20% of leaf whorls damaged; natural larval parasitism often reaches 20–70% [3]. The egg parasitoid *Telenomus remus* is a promising biological control agent and has already been found in at least five African countries [10].

3. CONCLUSION

The risk analysis indicates that the likelihood of *S. frugiperda* entering Uzbekistan is moderate to high: the pest has approached the region via Iran and Türkiye, and the southern and central irrigated areas of Uzbekistan are favourable for its development during the summer season. However, a country-specific climate model and an analysis of cold tolerance have not yet been carried out.

The following measures are proposed: (1) establishing an early warning system based on a network of pheromone traps in maize fields of Surkhandarya, Kashkadarya, Jizzakh and other border regions; (2) training laboratory specialists in identification according to EPPO standard PM 7/124; (3) strengthening quarantine inspection of fruit and vegetable consignments arriving from southern neighbouring countries; (4) developing a CLIMEX-based country-specific risk model for Uzbekistan.

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На русском языке

РИСК ПРОНИКНОВЕНИЯ КУКУРУЗНОЙ ЛИСТОВОЙ СОВКИ (*SPODOPTERA FRUGIPERDA* J.E. SMITH) В УЗБЕКИСТАН: АНАЛИЗ ФИТОСАНИТАРНОГО РИСКА

Мирзаева Зубайда Ашуровна

Аннотация: В тезисе на основе подхода анализа фитосанитарного риска (АФР) оценён риск проникновения в Узбекистан кукурузной листовой совки (*Spodoptera frugiperda*) – одного из наиболее опасных инвазивных вредителей мира. После первых вспышек в Африке в 2016 году, где потенциальные потери кукурузы в 12 странах оценивались в 8,3–20,6 млн т в год, вредитель распространился по Азии и был зарегистрирован в Турции в 2022 году и в провинции Керман (Иран) в 2023 году. В Узбекистане он не выявлен и включён в национальный перечень и перечень ЕАЭС как отсутствующий карантинный объект. Модель MaxEnt показала климатическую пригодность южных районов Центральной Азии, в том числе района Джизака в Узбекистане. Поскольку у вида нет диапаузы, а развитие начинается примерно при 12 °С, основной риск для Узбекистана – сезонное летнее вторжение на орошаемую кукурузу в результате миграций, а не круглогодичная акклиматизация. Предлагаются сеть феромонных ловушек раннего предупреждения в южных и приграничных районах, подготовка специалистов по идентификации согласно ЕРРО РМ 7/124, усиление контроля продукции из южных соседних стран и разработка страновой модели риска CLIMEX.

Ключевые слова: кукурузная листовая совка, *Spodoptera frugiperda*, анализ фитосанитарного риска, инвазивный вид, карантин, климатическая модель, миграция, мониторинг, кукуруза