Emerging Pest criteria for identifying pests of global concern

**Pest:** *Clavibacter nebraskensis* (Vidaver and Mandel 1974)

**Taxonomic Position:** Kingdom: Bacteria > Phylum: Actinobacteria > Family: Microbacteriaceae> Genus: *Clavibacter*

**Assessment date:** February 2025

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| **Step** | **Criteria** | **Description** | **Meets criteria? (Yes/No)** | **Justification** |
| **Step 1: Distribution and Spread** | Recent Geographical Spread | Recent pest outbreaks1 are reported in more than one area, showing a *significant* expansion of the pest’s distribution | Yes | In January 2025, the pest was detected in four provinces in South Africa, outside its known distribution in North America. |
|  | Current Distribution | The pest has a limited distribution in its endangered area2. | Yes | *C. Nebraskenis* is not widespread. Is currently restricted to four provinces in Southern Africa. Present in in Canada, the USA, and Mexico. Regulatory status to be confirmed in Mexico ; [cropprotectionnetwork.org](https://cropprotectionnetwork.org/publications/an-overview-of-gosss-bacterial-wilt-and-blight?utm_source=chatgpt.com) |
| **Step 2: Current Impact** | Economic Impact | The pest is causing substantial economic impact according to what is described in ISPM 11 and supplement 2 of ISPM 5 | Yes | Severe infections have been documented to cause yield losses of up to 50% in susceptible maize varieties, especially under favorable environmental conditions such as high humidity and warm temperatures (Jackson-Ziems et al., 2014).  Between 2012 and 2015, estimated total yield losses due to Goss’s Wilt in the U.S. and Canada exceeded 1.27 million tonnes, making it one of the most destructive maize diseases in the northern U.S. and Ontario (Wise et al., 2019).  From 2016 to 2019, maize diseases (including Goss’s wilt) led to an average annual economic loss of approximately $5.02 billion across the U.S. and Ontario, Canada (Mueller et al., 2020). |
|  | Environmental Impact | The pest is causing substantial environmental impact according to what is described in ISPM 11 and supplement 2 of ISPM 54. | No | No direct impact on wild ecosystems, minor agroecosystem effects. There is no substantial evidence to suggest that Goss’s Wilt adversely affects wild plant species or natural habitats. Its impact appears to be limited to cultivated maize and certain grass species within agricultural environments.  [Crop Protection Network](https://cropprotectionnetwork.org/publications/an-overview-of-gosss-bacterial-wilt-and-blight?utm_source=chatgpt.com) |
| **Step 3: Risk Evidence** | Likelihood of Introduction | The pest has a high likelihood of introduction in new areas based on assessment in line with ISPM 11. | Yes | Multiple pathways: infected seeds\*, residues, equipment, windborne spread. Favors climates in Africa, the Americas, and Asia.  *C. nebraskensis* has multiple potential pathways for introduction. It, spreads through both natural and human-mediated pathways. Naturally, it can disperse via wind-driven rain, contaminated soil, and infected crop residues, which act as reservoirs for future infections. Human activities, such as the movement of contaminated agricultural equipment and the trade of infected plant material, facilitate long-distance spread. While seed transmission is possible, studies indicate that transmission rates are relatively low (Flores-Lopez et al., 2024).  While the specific pathway of introduction into South Africa remains uncertain, the transcontinental jump from the Americas to Africa is a confirmed event, demonstrating the pathogen’s ability to establish beyond its previously known range. This occurrence significantly increases the likelihood of further introductions, as it indicates that existing trade, agricultural practices, or natural dispersal mechanisms are capable of facilitating long-distance spread. |
|  | Scale of Impacts in New Areas | The pest is likely to cause substantial impacts based on assessment in line with ISPM 11. | Yes | Expected to cause significant damage similar to North America, with major food security risks. Maize is also widely used as animal feed for both poultry and livestock. |
|  | Risk Management Challenges | The pest risk is likely to be difficult to manage effectively in new areas. | Yes | No chemical treatment available, resistant varieties limited, crop rotation and sanitation only partially effective. [BSPP Journals](https://bsppjournals.onlinelibrary.wiley.com/doi/10.1111/mpp.13268?utm_source=chatgpt.com) [Crop Protection Network](https://cropprotectionnetwork.org/publications/an-overview-of-gosss-bacterial-wilt-and-blight?utm_source=chatgpt.com) - [Purdue Agriculture](https://www.agry.purdue.edu/ext/corn/pubs/GossWilt-Pioneer.pdf?utm_source=chatgpt.com) - [Bayer Crop Science](https://www.cropscience.bayer.us/articles/bayer/goss-wilt-identification-and-management?utm_source=chatgpt.com) |

**Conclusion:**

The assessment confirms a significant expansion of *Clavibacter nebraskensis* beyond its previously known distribution, with detections in South Africa marking its first occurrence outside North America. While the specific pathway responsible for its transcontinental introduction from the Americas to Africa remains uncertain, the confirmed establishment in a new continent underscores the pathogen’s ability to spread and adapt beyond its historical distribution. Maize is a crop critical for global food security and livestock feed. This justifies escalating the pest to POARS action.

Given these factors, *C. nebraskensis* is classified as an **emerging pest of global concern**, warranting further assessment to determine the appropriate level of intervention and coordinated action.

**References:**

* Jackson-Ziems, T. A., Harveson, R. M., & Vidaver, A. K. (2014). *Goss’s bacterial wilt and blight of corn*. University of Nebraska-Lincoln Extension. Retrieved from https://extensionpublications.unl.edu/assets/html/g1909/build/g1909.htm
* Langemeier, M. R., Thompson, L. R., & Olson, J. D. (2017). *Economic impact of corn diseases in the U.S.* Purdue University Agricultural Economics Extension. Retrieved from https://ag.purdue.edu
* Mueller, D. S., Wise, K., Sisson, A., Smith, D. R., & Robertson, A. E. (2020). *Annual estimated economic losses due to corn diseases in the United States and Ontario, Canada, from 2016 to 2019*. Plant Health Progress, *21*(4), 275-283. Retrieved from <https://apsjournals.apsnet.org/doi/10.1094/PHP-05-20-0038-RS>
* Flores-López, L. F., Olalde-Portugal, V., Vidaver, A. K., Morales-Galván, Ó., Hernández-Rosales, M., & Huerta, A. I. (2024). Unlocking a Mystery: Characterizing the First Appearance of Clavibacter nebraskensis in Mexican Cornfields. Plant Disease, 108(5), 1374–1381. <https://doi.org/10.1094/PDIS-08-23-1493-RE>
* Osdaghi, E., Robertson, A. E., Jackson-Ziems, T. A., Abachi, H., Li, X., & Harveson, R. M. (2023). Clavibacter nebraskensis causing Goss’s wilt of maize: Five decades of detaining the enemy in the New World. Molecular Plant Pathology, 24(7), 675–692. <https://doi.org/10.1111/mpp.13268>