Netherlands Food and Consumer Product Safety Authority
Ministry of Agriculture, Nature and Food Quality

Quick scan for *Sesamia calamistis* (Hampson 1910)

National Plant Protection Organization, the Netherlands

Quick scan number: QS2021ENT001

Quick scan date: 28 October 2021

No.	Question	Quick scan answer for *Sesamia calamistis* (Hampson 1910)
1.	What is the scientific name (if possible up to species level + author, also include (sub)family and order) and English/common name of the organism? *Add picture of organism/damage if available and publication allowed*.	*Sesamia calamistis* (Hampson 1910) (Lepidoptera: Noctuidae: Hadeninae: Apameini). English : 'African pink borer' (EPPO, 2002)
2.	What prompted this quick scan? *Organism detected in produce for import, export, in cultivation, nature, mentioned in publications, e.g. EPPO alert list, etc.*	March, 5th, 2021, two living larvae of *S. calamistis* were intercepted in a shipment of *Zea mays* (corn cobs) from Senegal. This is the first interception of this species by the Dutch authorities. Although *S. calamistis* is not on the Q-list of the EU, it is an important pest in sub-Saharan Africa and its host range includes cereals and grasses that are grown in the EU.
3.	What is the current area of distribution?	*Sesamia calamistis* occurs across the entire sub-Saharan region, and some of the islands in the Indian Ocean such as Mauritius, Reunion, Madagascar and Comoros; in eastern Africa its occurrence ranges from sea-level to 2400 m altitude (Kfir et al. 2002; Ong'amo *et al.*, 2016.
4.	What are the hostplants?	The host range is restricted to Poaceae, and the main host plants include cereals. For example, it is a major pest on maize (*Zea mays*), *Sorghum bicolor*, and rice (*Oryza sativa*) in West Africa (Tams and Bowden 1953; Kfir *et al.* 2002) and millet (Youm and Gilstrap, 1993). It also infests sugarcane (*Saccharum officinarum*) and wheat (*Triticum aestivum*) (EPPO, 2002). Wild hosts include grass species (Poaceae) from a wide range of genera, such as *Cymbopogon*, *Paspalum*, *Pennisetum*, *Rottboellia*, some with a European distribution, such as *Echinochloa*, *Phragmites*, and *Setaria* (Ong'amo *et al.*, 2016).

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5.	Does the organism cause any kind of plant damage in the current area of distribution and/or does the consignment demonstrate damage suspected to have been caused by this organism? *Yes/no + plant species on which damage has been reported + short description of symptoms.* *Please indicate also when the organism is otherwise harmful (e.g. predator, human/veterinary pathogen vector, etc.).*	Of the *Sesamia* spp. that also occur in East and West Africa (like *S. cretica* and *S. nonagrioides botanephaga*), *S. calamistis* is the most widely distributed and economically important species of maize, *Sorghum* and sugarcane (Kouamé 1995; Kfir *et al.* 2002). It is the most widely distributed lepidopteran pest of sugarcane plantations of Ethiopia (Assefa *et al.*, 2006; Mengistu *et al.* 2009). Damage by stem borer larvae results in the killing of the growing point of the shoot, which increases leaf senescence and reduces the translocation of nutrients and leading to yield loss (Kouamé 1995; Mengistu et al. 2009). Moreover, stalk borer infestation increases the incidence and severity of stalk rot. Improved stem borer control in sorghum in regions like some parts of Nigeria where *S. calamistis* is dominant also improved yields by 16–19% (Kfir *et al.* 2002). In maize larvae also attack the corn cobs and feed on the seeds leading to damage to the marketable product (Ong'amo *et al.*, 2016).
6.	Assess the probability of establishment in the Netherlands (NL) (i.e. the suitability of the environment for establishment). a. In greenhouses b. Outdoors c. Otherwise (e.g. storage facilities, human environment)	Suitable hosts (cereals) in the Netherlands are only present outdoors and the probability of establishment of *S. calamistis* is low under Dutch climatic conditions (the climate is assessed to be unsuitable for establishment. In a factsheet, Ong'amo *et al.*, (2016) presents results of risk mapping scenarios of potential geographical distribution of the species under "current" (2000) and future (2050) global climatic conditions. For both scenarios, the establishment risk index (ERI, measured between 0 and 1) for the Netherlands is < 0.1 (Ong'amo *et al.*, 2016).
7.	Assess the probability of establishment in the EU (i.e. the suitability of the environment for establishment).	Empirical studies and model simulations both suggest that minimum temperatures make an establishment of *S. calamistis* very unlikely in Europe, with the exception of perhaps the southernmost regions of Europe. Khadioli *et al.* (2014) showed that the optimum temperature for development (i.e. shortest population doubling time) of *S. calamistis* is 28 °C. In their study among the different developmental stadia, the eggs of *S. calamistis* had the lowest thermal threshold of 9 °C. At the tested extremes of 12°C and 35°C, development ceased in all of the developmental stadia. Mutamiswa *et al.* (2018) also examined the cold tolerance of *S. calamistis* in relation to environmental heterogeneity (i.e. previous exposure to different environmental factors). While cold tolerance in *S. calamistis* improved upon previous exposure to starvation and desiccation, exposure to low temperature (rapid cold hardening, RCH) had a negative effect on cold tolerance, which was an opposite response observed in other stemborers such as *Busseola fusca* and *Chilo partellus* (Mutamiswa *et al.* 2018). Additional model predictions show a low likelihood for establishment in the southernmost parts of Spain and Portugal only but even there current conditions do not appear to be favourable for establishment (Ong'amo *et al.*, 2016). Model extrapolations to the expectedly warmer climate conditions in 2050 show an increased likelihood of permanent establishment mostly in these southernmost regions and including the southernmost parts of Turkey (Ong'amo *et al.*, 2016).

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8.	What are the possible pathways that can contribute to spread of the organism after introduction? How rapid is the organism expected to spread (by natural dispersal and human activity)?	The species may spread rapidly once it has been introduced. Adults fly long distances and can also passively spread by the transport of food (corn cobs) and feed (green vegetative parts of corn and grasses). (Ong'amo *et al.*, 2016).
9.	Provide an assessment of the type and amount of direct and indirect damage (e.g. lower quality, lower production, export restrictions, threat to biodiversity, etc.) likely to occur if the organism would become established in NL and the EU, respectively?	*Sesamia calamistis* is harmful to cereals but its potential effects are assessed to be limited for the EU due to unfavourable climatic conditions (see Q7).
10.	Has the organism been detected on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables)? *If "no", go to question 12*	Yes, fruits & vegetables.
11.	If the organism has been found on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables), what is the probability of introduction (entry + establishment)? *Only to be answered in case of an interception or a find.*	The probability of introduction through infested corn cobs is assessed to be low due the low probability of transfer: - corn cobs are meant for consumption and has a limited shelf life, - the pest arrives as immature stage and must first develop into an adult before it can initiate a population, - a female and male moth must be present for initiation of a population, - the climate is unsuitable for establishment in a major part of the EU
12.	Additional remarks	Sex pheromones for *B. fusca*, *C. partellus*, *S. calamistis*, *S. cretica*, *S. nonagrioides* and *C. ignefusalis* have been identified and are commercially available (Kfir *et a*l. 2002).
13.	References	Assefa Y., Conlong D.E., Mitchell A. 2006. First records of the stem borer complex (Lepidoptera: Noctuidae; Crambidae; Pyralidae) in commercial sugarcane estates of Ethiopia, their host plants and natural enemies. Proceeding of South African Sugarcane Technologist Association, 80: 202- 213. CABI, 2021. *Sesamia nonagrioides* (Mediterranean corn stalk borer). In: Invasive Species Compendium. Wallingford, UK: CAB International. https://www.cabi.org/isc/datasheet/49754#toDistributionMaps EPPO (2002) *Sesamia calamistis* (SESACA). Available at https://gd.eppo.int/taxon/SESACA (accessed) March 12, 2021). Jika A.K.N., Le Ru B., Capdevielle-Dulac C., Chardonnet F., Silvain J.F., Kaiser L. and Dupas D. 2020. Population genetics of the Mediterranean corn borer (*Sesamia nonagrioides*) differs between wild and cultivated plants. *PLoS ONE* 15(3): e0230434. Kfir R., Overholt W.A., Khan Z.R. and Polaszek A. (2002). Biology and management of economically important lepidopteran cereal stem borers in Africa. Annual Review of Entomology, 47: 701-731. Khadioli N., Tonnang Z.E.H., Ong'amo G., Achia T., Kipchirchir I., Kroschel J. and Le Ru B. 2014. Effect of temperature on the life history parameters of noctuid lepidopteran stem borers, *Busseola fusca* and *Sesamia calamistis*. *Ann. Appl. Biol.* pp 1-14, doi:10.1111/aab.12157

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		Kouamé KL 1995. Seasonal abundance of the two maize stem borers *Sesamia calamistis* and *Eldana saccharina* and bionomics of the *Sesamia* egg parasite, *Telenomus busseolae*. Ph.D. Thesis, Simon Fraser University. British Columbia, CA. 176. pp. Maiorano A., Donatelli M. and Fumagalli D. 2012. Potential distribution and phenological development of the Mediterranean Corn Borer (*Sesamia nonagrioides*) under warming climate in Europe. International Environmental Modelling and Software Society (iEMSs) 2012 International Congress on Environmental Modelling and Software Managing Resources of a Limited Planet, Sixth Biennial Meeting, Leipzig, Germany R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.) http://www.iemss.org/society/index.php/iemss-2012-proceedings Mengistu L., Tefera T., Assefa Y. and Yirefu F. 2009. Biology of *Sesamia calamistis* Hampson (Lepidoptera: Noctuidae) at Metahara. *Proc. Ethiop. Sugar. Ind. Bienn. Conf.* 1, 35-44. Mutamiswa R., Chidawanyika F. and Nyamukondiwa C. 2018. Superior basal and plastic thermal responses to environmental heterogeneity in invasive exotic stemborer Chilo partellus Swinhoe over indigenous Busseola fusca (Fuller) and Sesamia calamistis Hampson. Physiological Entomology, pp 1-12, DOI: 10.1111/phen.12235 Ong'amo G, Khadioli N, Le Ru B, Mujica N & Carhuapoma P, 2016. African pink stemborer, *Sesamia calamistis* (Hampson 1910). In: Kroschel J, Mujica N, Carhuapoma P & Sporleder M (eds.), Pest distribution and risk atlas for Africa. Potential global and regional distribution and abundance of agricultural and horticultural pests and associated biocontrol agents under current and future climates. International Potato Center (CIP). ISBN 978-92-9060-476-1. DOI 10.4160/9789290604761, Lima, Peru, pp. 195-207. Tams WHT, Bowden J. 1953. A revision of the African species of Sesamia Guenee and related genera (Agrotidae— Lepidoptera). *Bull. Entomol. Res.* 43: 645–78. Youm O. and Gilstrap F.E. 1993. Population dynamics and parasitism of *Coniesta (=Haimbachia) ignefusalis, Sesamia calamistis* and *Heliocheilus albipunnctella* in millet monoculture. Insect Sci. Applic. 14, 419-426.
14.	**Conclusions**	This Quick scan was prompted by the interception of two larvae of *Sesamia calamistis* on corn cobs imported from Senegal. The organism is not known to be present in the EU. It is present in sub-Saharan Africa where it is a pest on Poaceae. The risk of the species for the EU is assessed to be low because of unfavourable climatic conditions for establishment.
15.	**Follow-up measures**	None