

NEW DISEASE REPORT

First report of *Elsinoë phaseoli* causing scab of common beans in Kenya

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In a 2022 field survey of 84 farms in the major regions of bean cultivation (Central, Nyanza, Rift Valley and Western) of southern Kenya,

scab symptoms, similar to those documented by Jenkins (1931) and Phillips (1994), were observed on common bean plants in all four

FIGURE 1 Bean scab symptoms: (a) grey leaf lesions, (b) leaf curl, (c) distorted pods with grey to liver-brown lesions, and (d) complete defoliation exposing diseased pods.



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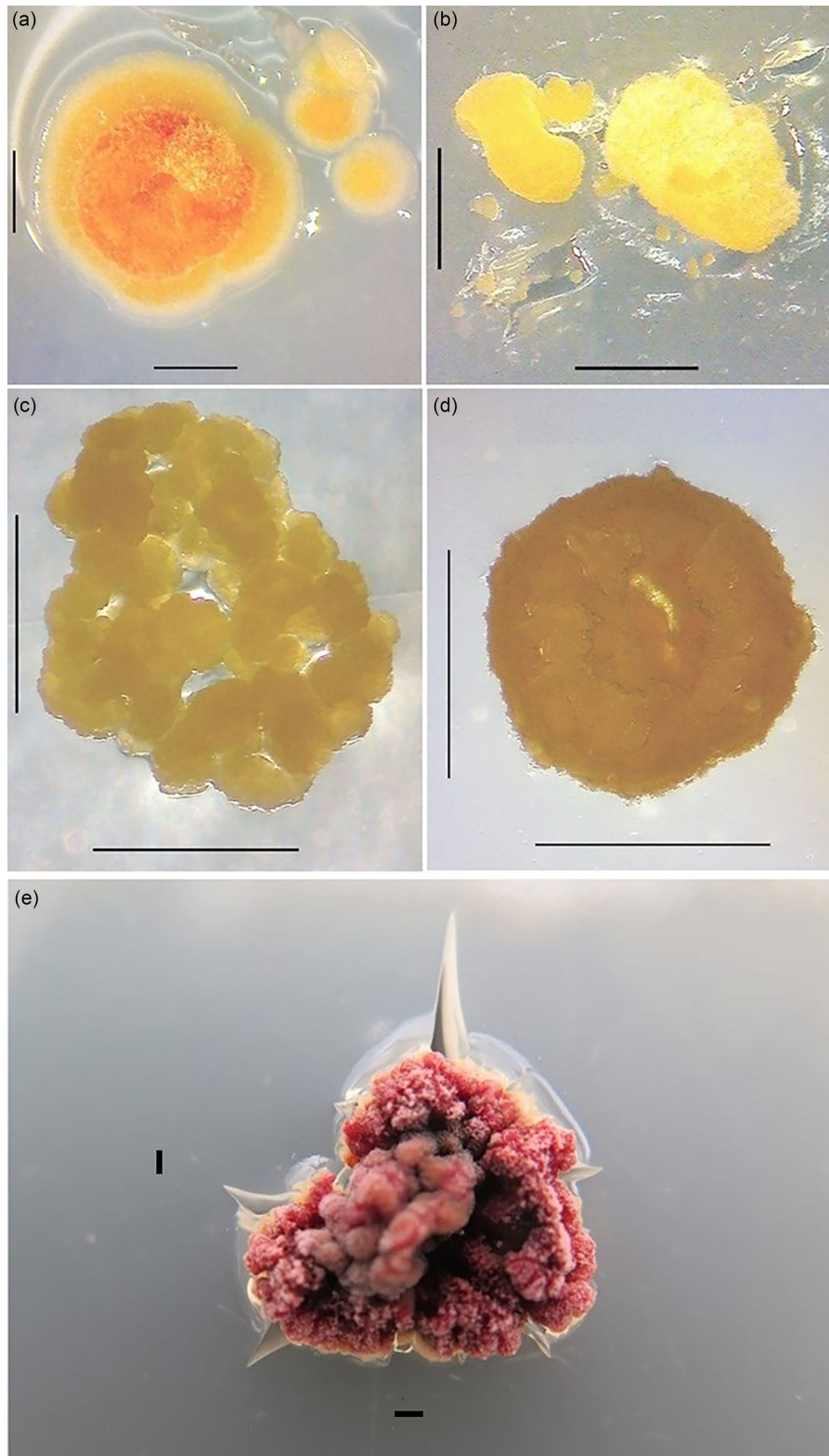


FIGURE 2 *Elsinöë phaseoli* colonies on potato dextrose agar media: (a-d) 5-day-old colonies, and (e) 21-day-old colony (all imaged from the top except d). Bars = 1 mm.

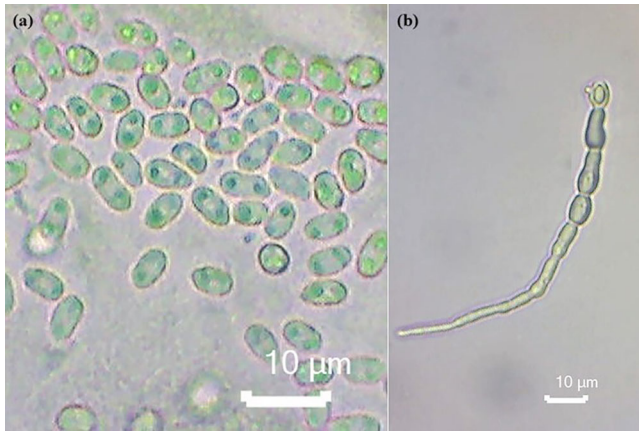


FIGURE 3 (a) oblong or elliptical, hyaline and mostly biguttulate conidia; (b) unbranched conidiophores with conidia forming at the tips of conidiogenous cells. Bars = 10 μm .

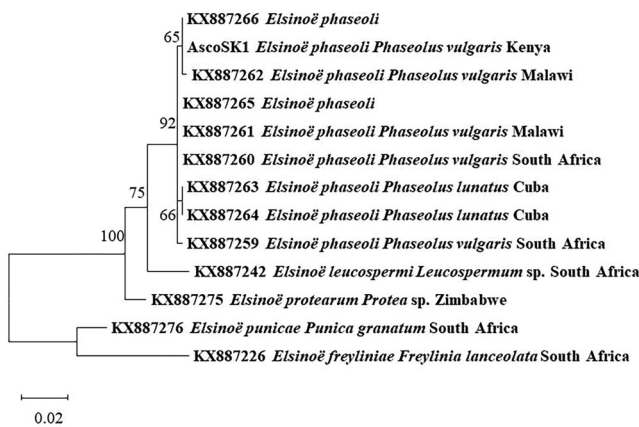


FIGURE 4 Phylogenetic tree with the highest log likelihood, depicting taxa clustering percentages. Horizontal scale denotes genetic distance. Outgroup species include *Elsinoë freyliniae*, *E. leucospermi*, *E. protearum* and *E. puniceae*. The *E. phaseoli* isolate from this study is labelled AscoSK1.

regions. Symptoms were observed on the leaves, stems and particularly the pods of affected plants (Figure 1). Light-green round to irregular lesions were observed on leaves, progressing into raised areas of grey, brown, or brick-red necrotic tissue. Elongated lesions developed along the stems, often leading to twisting and distortion. On the stems light-green sunken spots were observed which developed into raised, grey or brown cork-like formations.

Bean scab has been reported in Kenya but the cause has not been resolved. Leaf tissue from 20 diseased plants was collected in Kakamega, Kenya and surface-disinfected with 95% ethanol then dried with a sterile paper towel. Scab lesions (5 mm) with mature acervuli were excised, transferred to microfuge tubes containing 0.005% Tween 20 solution, and the suspension streaked onto potato dextrose agar before incubation in the dark for 21 days at room temperature. After

four to seven days, slow-growing, irregular-shaped 1 mm colonies formed. They displayed raised growth and diverse colours (orange to brown to dark red), featuring cerebral or corrugated indentations with undulated margins (Figure 2). Sporulation revealed oblong or elliptical, hyaline, mostly biguttulate conidia measuring 3–6 μm identifying the isolates as *Elsinoë* sp. (Figure 3).

DNA was isolated from two-week-old colonies as described by Mahuku (2004), and PCR was used to amplify the ITS region of a representative isolate, AscoSK1 (White et al., 1990). BLASTn search demonstrated that the sequence of AscoSK1 had 100% identity with *Elsinoë phaseoli* (GenBank Accession No. KX887266.1). Phylogenetic analysis clustered isolate AscoSK1 in the same clade as *Elsinoë phaseoli* (Figure 4) (Fan et al., 2017). The ITS sequence of isolate AscoSK1 was deposited in GenBank (OR686938).

To test pathogenicity, AscoSK1 conidia (c. 1×10^4 conidia/ml) were used to inoculate eight three-week-old plants of *P. vulgaris* cv. GLP 2 using a combination of the cotton-plaster technique and spraying, with sterile water used as a control (Phillips, 1994). Plants were wrapped in polythene for 18–20 hours in the dark, the polythene and cotton wool were removed and the plants were transferred to a screenhouse with a 12-hour natural light and temperature cycle. Typical scab symptoms were observed in all inoculated plants within six to ten days, while the water-inoculated controls remained symptom-free. The pathogen was reisolated and identified morphologically, with consistent results in two replicate experiments.

This is the first report of *E. phaseoli* causing common bean scab in Kenya, further research is required into the epidemiology and management of the disease.

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