Table 5. Diseases reported in *C. sativa* caused by members of the *Fusarium sambucinum* Species Complex.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Species** | **Initial isolation** | **Symptoms\*** | **Molecular markers** | **Pathogenicity Assays** | **Source** |
| ***Controlled environments (includes greenhouse, hydroponic, and indoor facilities)*** |
| *F. graminearum* | Flower buds, preharvest | Mycelium - prolific whitish-pink, causes wilt in pathogenicity assay.  | EF-1α/ EF1 and EF2a; ITS1-5.8S-ITS2/ UN-UP18 S42 and UN-LO28 S576Bb | Yes, flower buds | Punja and Ni, 2021 |
| **Unspecified or multiple** |
| *F. graminearum* | Flowers and leaves of plants  | Foliar and flower blight, circular, light-brown necrotic lesions, tips of flowers necrotic, mycelium apparent | EF-1α/ EF-1 and EF-2a; RPB2/ bRPB2-6F and bRPB2-7Rc;β-tubulin/ T1 and T22d | Yes | Thieseen et al., 2020 |
| **Field** |
| *F. graminearum* | Flower buds, preharvest | Bud rot, necrosis, mycelium apparent | EF-1α/ EF1 and EF2a | Yes, flowers of greenhouse-grown plants | Yulfo-Soto et al., 2021 |
| *F. graminearum* | Flower buds, preharvest | Wilt, co-occurrence with *F. tricinctum and F. avenaceum* | EF-1α/ EF1 and EF2a; ITS1-5.8S-ITS2/ UN-UP18 S42 and UN-LO28 S576Bb | Yes, rooted cuttings | Punja and Ni, 2021 |
| *F. brachygibbosum* | Foliage and crown | Yellowing of foliage and sunken lesions in crown. Co-isolated with *F. oxysporum* | EF-1α/ EF1 and EF2a; ITS1-5.8S-ITS2/ UN-UP18 S42 and UN-LO28 S576Bb | Not specified | Punja et al., 2019  |
| *F. brachygibbosum* | Crown outer bark, cortical and vascular tissues | Yellowing and wilting followed by total plant collapse in hot weather. Crown regions - dark and sunken with internal tissue discoloration. Root mass reduction.  | EF-1α/ EF1 and EF2a; ITS1-5.8S-ITS2/ UN-UP18 S42 and UN-LO28 S576Bb | Yes, rooted cuttings | Punja et al. 2018  |

Molecular regions: EF-1α = Translation elongation factor 1-α; ITS1-5.8S-ITS2 = Internal transcribed spacer region of ribosomal DNA; RPB2 = subunit of RNA polymerase II.

aO’Donnell et al., 1998; bSchroeder et al., 2006; cMatheny, 2005; dO’Donnell and Cigelnik, 1997.