The Crown Rot ‘Deadhead’ Phenomenon in Durum Wheat

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Overview
- **Disease**: Crown rot of wheat, caused by *Fusarium pseudograminearum* (Fp).
- **Symptoms**: Tissue browning, deadheads (prematurely senescent stems) and yield loss.
- **Target Tissues**: Evidence indicates fungal interactions with xylem and phloem tissues have a role in the disease process.
- **Hypothesis**: Stems exhibiting the deadhead symptom have more Fp biomass and greater vascular tissue colonisation than comparable living stems.

Methods
- Susceptible durum wheats EGA Bellaroi (2011, 2012, 2013, 2014) and Hyperno (2014) were grown in Fp infested fields at Wellcamp, Qld and Narrabri, NSW, respectively.
- Each year plants exhibiting both senescent (deadhead) stems and non-senescent (living) stems were collected during early milk development.
- Paired stems from each plant were sectioned from the base into 0-6, 6-12 and 12-18 cm portions.
- Visual ratings of percentage browning were performed on each section.
- Fp biomass was estimated in each section using qPCR.
- Colonisation of each vascular bundle in sections taken at 1, 7 and 13 cm was scored as +/- based on the presence of at least one hypha in either xylem, phloem or both.

Results
- Sections from senescent stems (Fig. 1) exhibited higher levels of visual discolouration than non-senescent stems (Fig. 2).
- Fp biomass was greater in senescent stem sections than in non-senescent stems (Fig. 2).
- Senescent and non-senescent stems showed vascular colonisation (Fig. 3). Differences in colonisation between these stems were greatest at 1 cm (Fig. 4).

Conclusions
- Fp frequently grew to at least 18 cm above the crown in infected stems.
- Vascular colonisation is not a sufficient condition for stem death.
- However, more frequent vascular bundle colonisation and profuse hyphal growth were associated with senescent stems.

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