FiBL

Master Thesis at FiBL Plant Breeding Group

Title	Molecular characterisation and control of Colletotrichum lupini, the causal agent of anthracnose disease, in white lupin (Lupinus albus)
Context	Swiss agriculture is highly dependent on importing protein crops, mostly soybean, from outside Europe. For the organic sector in particular, a more sustainable and local production of legumes is urgently needed. FiBL supports the organic grain legume production in Switzerland focussing research on pea, faba bean, soybean and lupin. Lupin is tolerant to cool spring and dry summer conditions and accumulates nitrogen in the soil leaving a fertile, well-structured soil for the following crop. It is also known to offer nourishment for bees and other insects and produce protein rich seeds for animal feed and human consumption. One of the three commonly cultivated lupin species in Europe, the white lupin (Lupinus albus), is well suited for the majority of Swiss soils. However, it is currently not grown due to a risk of anthracnose infection, caused by Colletotrichum lupini (Nirenberg et al., 2002). The fungus is transmitted via the seed and can cause substantial or near-total yield loss. In 2014, FiBL has started lupin variety field trials to promote lupin growing in Switzerland and initiate a breeding programme for anthracnose resistance.
Procedure/Method	The aim of this project is to reduce the sources of primary field infection and identify tolerant breeding material. A qPCR-based detection methods has been developed that can now be used to address the following topics: • Lifecycle of C. lupini during the growing period of white lupin • Evaluation of different seed treatment methods for their effectiveness to reduce pathogen infection • Develop and apply a screening system to identify white lupin genotypes with tolerance against C. lupini
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Starting period	**Immediately or after arrangement**

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Location	FiBL, Frick, Kanton Aargau, Switzerland, www.fibl.org
Language	English or German
Literature	Talhinhas P., Baroncelli R. and Le Floch G. (2016). Anthracnose of Lupins Caused by Colletotrichum Lupini: A Recent Disease and a Successful Worldwide Pathogen. Journal of Plant Pathology 98 (1): 5–14. Feiler U. and Nirenberg H.I. (2005): Anthraknose an Lupine Teil 3: Diagnoseschlüssel zur Krankheit anhand von Symptombildern im Feldbestand. Nachrichtenbl. Deut. Pflanzenschutzd., 57 (8): 161-166. Feiler U. and Nirenberg H.I. (1998): Eine neue klassische Methode zur Bestimmung des Colletotrichum-Befalls an Saatgut von Lupinus ssp. Nachrichtenbl. Deut. Pflanzenschutzd., 50, 259-262. Kreye H. and Niepold F. (2007): Verwendung des PCR-Nachweises zu Epidemiologie-Studien des Erregers der Anthracnose (Colletotrichum lupini) in Lupinen. Nachrichtenbl. Deut. Pflanzenschutzd., 59 (7), S. 166–169, Nirenberg H.I., Feiler U. and Hagedorn G. (2002): Description of Colletotrichum lupini comb. nov. in modern terms. Mycologia 94 (2): 307-320. Thomas G.J. and Adcock K.G. (2004): Exposure to dry heat reduces anthracnose infection of lupin seed. Australian Plant Pathology 33, 537-540. Waldow F., Wächter R., Jahn M., Koch E., Spieß H., Vogt-Kaute W., Müller K.J. und Wilbois K.P. (2006): Alternative Saatgutbehandlungen im ökologischen Landbau- Ergebnisse eines Forschungsvorhabens. Mittl. Biol. Bundesanst. Land- Forstwirtsch. 400, 332-333.