

## Research Article

## Viability and Infection Potential of Wheat Powdery Mildew Pathogen (*Blumeria graminis* f.sp. *tritici*) Conserved under Different Temperature Regimes and Conditions

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### Abstract

Powdery mildew incited by *Blumeria graminis* f.sp. *tritici* (*Bgt*) is an emerging disease of wheat. Evaluation for resistance genotypes is our regular activity during the off-seasons of wheat cultivation. Powdery mildew inoculums are essential for artificial inoculations and identification of true resistant types. However, standard procedures are lacking for the multiplication and preservation of this pathogen. Hence, the main aim of present investigation was to find out a suitable method of conservation of asexual spores and subsequent utilization for establishing the disease. For this, two set of experiments were carried out in our hot spot location (ICAR-IARI Regional station, Wellington). In first set, 200 mg of asexual spores (conidia) were conserved in cellulose capsules at four different temperatures regimes. In second set, two volumes (10 and 100mg) of conidia were preserved in three different conditions in same type cellulose capsules. The duration of study in both experiments was 240 days of post storage. Critical analysis of overall results ascertained that continuous maintenance and re-inoculations of *Bgt* were effective for maintaining the viability and virulence of *Bgt* with profuse conidiogenesis on seedlings (cv. WI 711) under glasshouse (20-25±2C) and poly house with controlled conditions (18-20±2C; 85-90% RH with a photoperiod of 16h light and 8h darkness at 100 ± 5 µmol m<sup>-2</sup> s<sup>-1</sup> by fluorescent tubes). However, frequent isolation, re-inoculation and maintenance on seedlings were cumbersome process. Alternatively, we found that the tablet capsules made of cellulose were convenient for collection and conservation of *Bgt* conidia. The normal state of *Bgt* conidia was restored from subfreezing (-20C) after intermediate thawing (5 min) in a water bath (25 C). Fresh conidia recorded significantly high (84-86%) germination. There was no much reduction in germination percentages up to 60 days of post storage of 200mg conidia in cellulose capsules. But the germination and infection potential of *Bgt* conidia were affected significantly irrespective of temperatures regimes after 120 days. Conidial viability was reduced to a tune of 26.5per cent at low (6-7±2C) and 19.3per cent at sub-freezing (-20±1C) temperatures on 120 dps. Further 10.67 and 16per cent reduction in germination was noticed on 240<sup>th</sup> day of storage. In the second set, fresh conidia germinated between 84.0 to 86per cent on cavity slides incubated under moist chambers and 69.3 to 73.3per cent germination on seedlings. Significant decline in germination (%) was recorded in both the conditions after 15 days of post storage period. As compared to first set of experiment, conidia in cellulose capsules and conserved at ambient conditions were unable to infect and express appreciable level of symptoms after 60 days of post storage. However, few conidia from capsules preserved at low and subfreezing temperatures germinated and expressed symptoms on seedlings. Conidial mass from 240 days after storage under these low temperature regimes also produced a severity scale of 1.67-5.3, which was encouraging for further multiplication. The interaction analysis between duration and storage conditions of *Bgt* conidia revealed that low and subfreezing temperatures are effective for medium-term conservation and re-inoculations on seedlings. We summarize that the tablet cellulose capsules are user-friendly for collection, preservation,

retrieving and re-inoculations of *Bgt* conidia. The conidia retrieved from low and subfreezing temperatures have practical utility in terms of augmentation and recurrent inoculations during off-seasons. With these advantages, 275 *Bgt* isolates have been conserved using tablet cellulose capsules at low and sub-freezing temperatures for further research at our station.

**Keywords:** *Blumeria graminis* f.sp. *tritici*, conidia, germination, infection potential, storage conditions, viability, wheat powdery mildew.

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