

## TECHNICAL ARTICLE

## Sanitary quality of seed of *Paspalum* species

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### Abstract

Brazil has been developing research for selection of native species of *Paspalum* for use as turfgrass, nevertheless little is known about the sanitary quality and pathogens associated to the seeds, being the aims of this study. Subsamples of 100 seeds of two accessions of *Paspalum notatum* Flügge (PN 01 and PN 04) and one accessions of *Paspalum lepton* Schult. (PL 01) were submitted to the blotter test at 20 °C with a 12-h photoperiod for 7 days. The *Penicillium* and *Curvularia* genus incidence were highest in the three accessions of *Paspalum*. The seed health quality was variable between accessions, with more than 56% of incidence of the fungus *Curvularia* on the seeds. This study reported for the first time the occurrence of *Curvularia* spp. and *Cladosporium herbarium* in seeds of *P. lepton*, in the Northeast region of Brazil.

**Keywords:** grass, green cover, fungi, *Paspalum notatum*, *Paspalum lepton*.

### Resumo

#### Qualidade sanitária de sementes de espécies de *Paspalum*

O Brasil vem desenvolvendo pesquisas para seleção de espécies nativas de *Paspalum* para uso como gramados, porém pouco se sabe sobre a qualidade sanitária e os patógenos associados às sementes, sendo os objetivos deste estudo. Subamostras de 100 sementes de dois acessos de *Paspalum notatum* Flügge (PN 01 and PN 04) e de um acesso de *Paspalum lepton* Schult. (PL 01) foram submetidas ao teste de papel de filtro a 20 °C, com fotoperíodo de 12 h, por 7 dias. Os gêneros *Penicillium* e *Curvularia* apresentaram maior incidência nos três acessos de *Paspalum*. A qualidade das sementes foi variável entre os acessos, com mais de 56% de incidência do fungo *Curvularia* nas sementes. Este estudo relatou pela primeira vez a ocorrência de *Curvularia* spp. e *Cladosporium herbarum* em sementes de *P. lepton* na região nordeste do Brasil.

**Palavras-chave:** cobertura verde, fungos, gramado, *Paspalum lepton*, *Paspalum notatum*.

## Introduction

The *Paspalum* L. genera are among the main warm season grasses used for lawns. The seed propagation contributes to the decrease of the cost of establishment, besides maintaining the exact characteristics of the mother plant genotype, because they are apomictic species (Maximino et al., 2017). *Paspalum notatum* has been widely used in lawns in urban areas because of its resistance to trampling, drought, heat and high rate of establishment

(Trenholm et al., 2001). In Brazil, a mixture of biotypes and ecotypes of *Paspalum notatum* var. *notatum*, known as “grama-batatais”, is used in gardens, functional areas of airports, industrial parks and roads, demonstrating the potential of this native species for use as tropical turfgrasses (Souza et al., 2016; Souza et al., 2020).

Regarding sanitary quality, little is known about the pathogens associated with seeds of tropical forages produced. The pathogens present in seeds can affect germination, seedling development and production of

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<https://doi.org/10.1590/2447-536X.v26i3.2065>

Received Jun 21, 2019 | Accepted May 18, 2020 | Available online Jun 25, 2020

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Area Editor: Silvia Galleti

forage plants in the field. The introduction of the pathogen through the seeds is a possible source of long-distance dissemination and could play a role of transferring them to a new place (Lazarotto et al., 2012; Rioux et al., 2014). Pathogens can also prevent seeds from being traded on the global market, as some countries may have restrictions on seeds with sanitary issues (Mallmann et al., 2013; Santos et al., 2014). Seed health testing to detect seed borne pathogens is an important key step in the management of crop diseases. This study aims to evaluate the sanitary quality in *Paspalum notatum* and *P. lepton* accessions with potential for use as turfgrass.

### Material and Methods

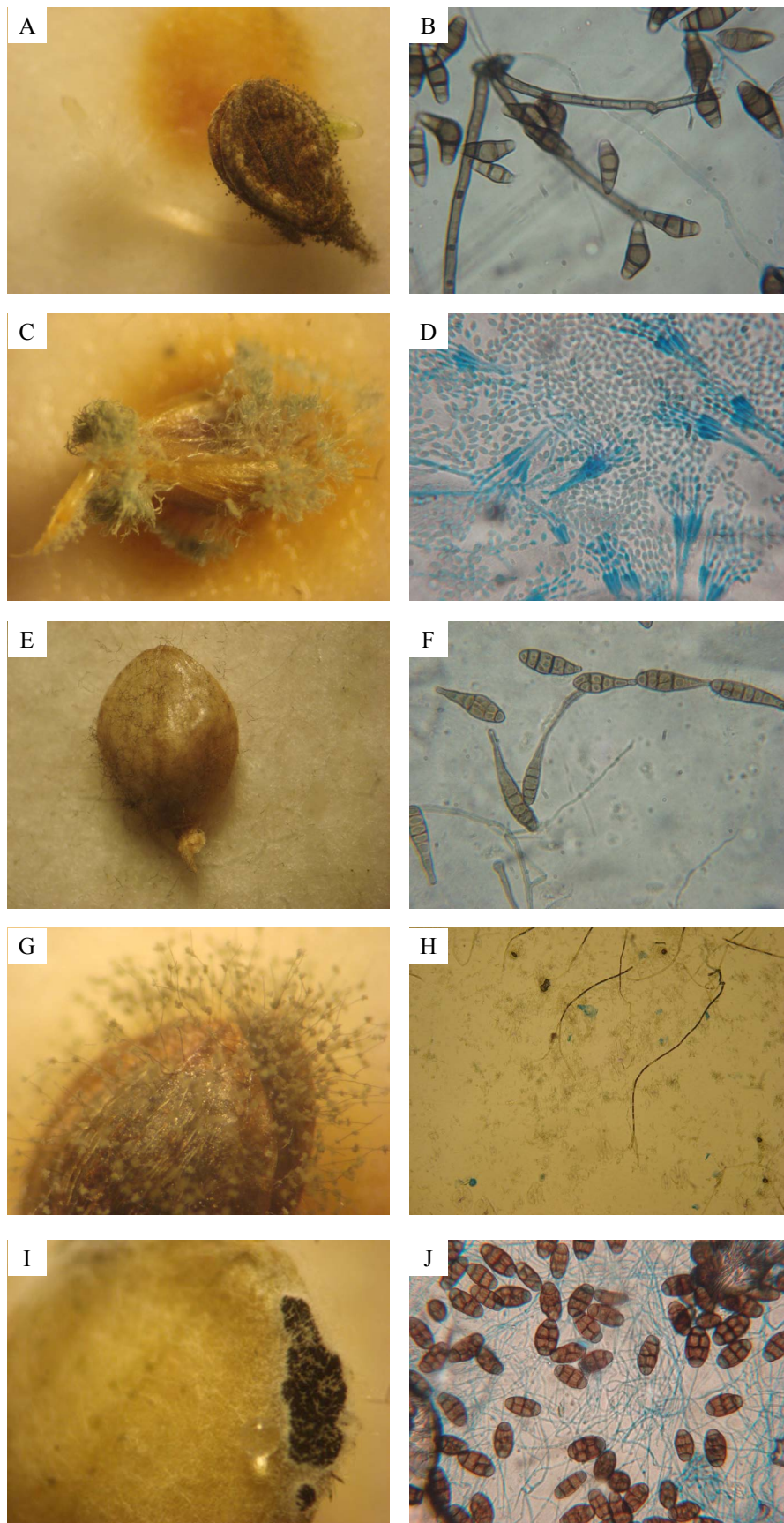
The seeds of three accessions, *P. notatum* Flügge (PN 01 and PN 04) and *P. lepton* Schult. (PL 01), from the Germplasm Embrapa Bank (Embrapa/ Southeast Livestock) were collected from an experimental area installed in Camaragibe, Pernambuco, Brazil (7°56'33"S and 35°01'50"W, 100 m elevation), in April 2014. Then seeds were stored in paper bags at 6.5 °C and relative humidity of 81% for further analysis.

The health analyses of the seeds were conducted at the Seed Pathology Laboratory (Institute of Agronomy of Pernambuco - IPA). Four repetitions of 100 seeds were distributed on three sheets of sterilized filter paper, moistened with sterilized distilled water and placed in plastic boxes ('Gerbox'), previously disinfected with 1% sodium hypochlorite (Brasil, 2009). The seeds were

incubated for seven days under a photoperiod of 12 hours at a temperature of  $20 \pm 2$  °C. Fungal structures were observed under a stereoscopic and optical microscope and identified with the help of an identification key (Barnett and Hunter, 1972). The results presented the percentage incidence for individual pathogen. The experimental design was completely random and the means compared with Tukey's test at the 5% probability level.

### Results and Discussion

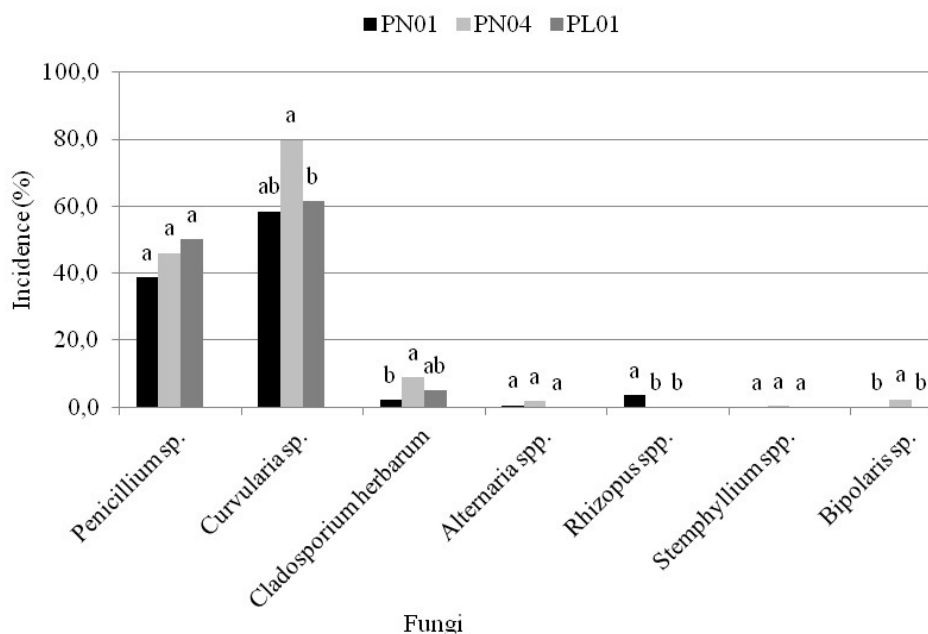
The following fungi were identified in seeds of accessions of *Paspalum*: *Curvularia* spp., *Penicillium* spp., *Alternaria* spp., *Cladosporium herbarum*, *Stemphyllium* spp. (Figure 1), *Rhizopus* spp. and *Bipolaris* sp. The *Penicillium* and *Curvularia* genus incidence were highest in the three accessions of *Paspalum*. Among the accessions of *P. notatum*, it was observed that the PN 04 access was more susceptible than the PN 01 access, presenting a greater number of species of fungi. Some important and potentially pathogenic fungi have been detected in the seeds of *Panicum maximum* and *Brachiaria* spp., such as *Curvularia*, *Phoma*, *Fusarium*, *Exserohilum*, *Cercospora*, *Fusarium*, *Cladosporium* and *Helminthosporium* (Mallmann et al., 2013; Marcos et al., 2015; Silva et al., 2019). The species of phytopathogenic fungi most frequent in seed lots of *Paspalum guenoarum* ecotype "Azulão" were *Bipolaris micropus*, *Curvularia geniculata*, *Fusarium incarnatum* and *Phoma herbarum* (Gasparetto et al. 2017).



**Figure 1.** Fungi detected in seeds in access *Paspalum*: *Curvularia* spp. (A; B), *Penicillium* spp. (C; D), *Alternaria* spp. (E; F), *Cladosporium herbarum* (G; H), and *Stemphylium* spp. (I; J).

This study reported for the first time the occurrence of *Curvularia* sp. and *Cladosporium herbarum* in seeds of *P. lepton*, in the Northeast region of Brazil. The genus *Curvularia* had the highest incidence among fungi identify (above 56%) in the all accessions (Figure 2). In general, other studies report the susceptibility of the *Paspalum* species to attacks of fungi from genre *Bipolaris micropus*, *Epicoccum sorghinum*, *Fusarium incarnatum*,

*Curvularia geniculata* and *Curvularia lunata* (Lin et al., 2015; Malkanthi et al., 2016; Gasparetto et al. 2017). The *Curvularia* leaf spot is one of the important diseases in golf courses maintenance management (Lin et al., 2015). Symptoms are characterized by reddish-brown or black spots. In some cases, the spots are confined to the top or bottom of the glumes and have a clearer center (Prabhu et al., 1999).



**Figure 2.** Incidence of different fungi on seeds of accessions of *Paspalum* (PN 01, PN 04 and PL 01). Camaragibe, Pernambuco, Brazil, 2014. The means followed by the same letter don't differ statistically ( $p < 0.05$ ).

## Conclusions

Additional studies are necessary to verify the potential for transmission of and survival of these phytopathogenic fungi in the *Paspalum* genus seeds and selection of products for the control of pathogens in this grass.

### Author Contribution

**S.A.C.G.S.:** conduction and evaluation of the experiment and writing of the manuscript; **A.G.S.:** conduction and evaluation of the experiment and writing of the manuscript; **V.L.:** performed the idea, manuscript writing and corrections; **A.C.R.C.:** manuscript writing and corrections; **R.C.T.R.:** performed the idea, experiments development, manuscript writing and corrections.

## Acknowledgements

The authors are thankful to: EMBRAPA (Empresa Brasileira de Pesquisa Agropecuária), CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico), CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), FACEPE (Fundação de Amparo à Ciência e Tecnologia de Pernambuco), IPA (Instituto Agrônômico de Pernambuco), the UFRPE students for all their support to this study.

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