EFFECT OF DIFFERENT NATURAL BAITS ON ZOOSPORE AND OOSPORE PRODUCTION BY TWO *PYTHIUM* SPECIES

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Abstract

Pieces of *Zea* leaf were found to be a good substrate for the production of zoosporangia and zoospores in *Pythium*. Deciduous *Quercus* leaf pieces were a good substrate for oogonial production by *Pythium aquatile* and *P. dissotocum*. Spore production was related to temperature: *P. aquatile* produced more zoospores and oogonia at 5°C whereas the optimum for *P. dissotocum* spore production was closer to 15°C.

Introduction

Grass blade is commonly used for the production of zoospores by *Pythium* species (Emerson, 1958; Webster & Dennis, 1967). A comparative assessment of other particulate organic nutrient sources on the production of zoospores by *Pythium* species has not been reported. The present report describes the effect of different natural baits on zoospore and oospore production by 2 *Pythium* species viz., *P. aquatile* and *P. dissotocum*.

Materials and Methods

Corn meal agar blocks (5 mm²) from actively growing axenic cultures of *Pythium aquatile* and *P. dissotocum* were transferred to Petri dishes containing sterile double glass distilled (DGD) water. Segments (25x5 mm) of *Agrostis, Zea, Quercus* (deciduous) and *Potamogeton* leaves were autoclaved at 15 psi for 10 minutes, cooled, rinsed and placed on the agar blocks of the *Pythium* species. Cultures were incubated for 24 h at 15°C after which time the leaf pieces were colonized by the test fungi and transferred to fresh Petri dishes containing DGD water. Two similar sets were prepared for incubation at 5 and 15°C. There were three replicates for each treatment. Cultures were observed under low power (x10 ocular and x4 objective) through the lid of the Petri dish after each 24 h for up to 7 days for zoosporangial production. Number of full zoosporangial vesicles per 330 μm length of substrate (μ diameter of microscopic field) was recorded at three different places on each leaf segment; a mean value was calculated for each substrate and expressed as number of vesicles mm⁻¹. The number of oogonia was recorded using X10 objective, and the final count taken after 15 days. The whole experiment was repeated once, and a third, partial data was obtained for confirmation.
Table 1. Number of oogonia of *Pythium aquatile* and *P. dissotocum* produced per millimetre of leaf segment after 15 days at two incubation temperatures.

<table>
<thead>
<tr>
<th>Treatment</th>
<th><em>P. aquatile</em></th>
<th></th>
<th><em>P. dissotocum</em></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5°C</td>
<td>15°C</td>
<td>5°C</td>
<td>15°C</td>
</tr>
<tr>
<td>Zea</td>
<td>379</td>
<td>271</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Agrostis</td>
<td>436</td>
<td>236</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quercus</td>
<td>900</td>
<td>629</td>
<td>0</td>
<td>521</td>
</tr>
<tr>
<td>Potamogeton</td>
<td>607</td>
<td>234</td>
<td>362</td>
<td>50</td>
</tr>
</tbody>
</table>

(No. of oogonia/mm leaf segment)

Results and Discussion

Results are given in Fig. 1 and Table 1. Generally the zoospore production was highest on first, or in some cases, on the second day, gradually declining thereafter. Zoospore production declined more gradually at 5°C; at 15°C a sharp decline occurred after 24 h. Zea leaf pieces were found to be the best substrate for zoospore production. For *P. aquatile* the temperature for zoospore production was nearer to 5°C but for *P. dissotocum* the optimum was closer to 15°C.

*P. aquatile* produced oogonia on all the substrates tested, whereas *P. dissotocum* produced oogonia only on *Quercus* and *Potamogeton* leaves. *Quercus* leaf proved to be the most suitable substrate for oogonial production for both species followed by the *Potamogeton* leaves. The *Agrostis* leaves were least satisfactory. Temperature optima were similar for zoospore and oogonial production.

For both the two species tested, *Zea* and *Quercus* leaves gave enhanced production of zoospores and oogonia respectively. The temperature preferences for both zoospore and oospore production were similar for a given species. This observation may facilitate preparation of sporulating isolates for class demonstration. The applicability of these results to other zoosporic species of *Pythium* needs investigation. It may be mentioned that *P. opalinum* (Shahzad et al., 1990) failed to produce zoosporangia and zoospores by standard techniques or the method described by Emerson (1958), but produced spherical sporangia and zoospores at 15°C when grown on *Zea* leaves.
Fig. 1. Mean number of zoosporangial vesicles mm\(^{-1}\) recorded at 24 h interval on different leaf baits. The bars at each datum point represent the first and repeat experiments respectively.
References


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