
NUCLEAR BEHAVIOUR DURING GERMINATION OF UREDOSPORES OF Puccinia arachidis Speg

A. B. DE
Department of Botany, Burdwan Raj College, Burdwan 713104, India.

Puccinia arachidis Speg, incitant of rust of groundnut (Arachis hypogaea L.), has been reported from various parts of India1–5. But no report is available regarding nuclear behaviour during development of infection structure by its uredospores which, in many rust fungi, is the prerequisite for establishment of intercellular hyphae within its host. The present paper deals with these studies.

The uredospores of P. arachidis were scraped from the freshly collected infected leaves and allowed to germinate in distilled water of different pH, varying from 2.5–7.5 (adjusted with normal NaOH or HCl at

Figures 1–7. 1. Binucleate uredospore. 2. Germinated uredospore. 3. Germ tube showing four nuclei. 4. Germ tube showing development of appresorium at its apical portion. 5. Appresorium containing four nuclei. 6. Infection structure showing appresorium, infection peg and quadrinucleate substomatal vesicle. 7. Apical portion of nondifferentiated germ tube showing sepum between the two nuclei.
0.5 unit increments) at 10°C, 14°C, 20°C, 27°C and 30°C under 0, 6, 12, 18 and 24 hr of light (intensity 1000 lux) following De and Roy6 and De7.

For studying nuclear behaviour the uredospores showing development of different stages of infection structure were fixed in equal parts of propionic acid and ethyl alcohol for 24 hr. The slides were then washed in 70% alcohol for 5 min, transferred to alcoholic-HCl-Carmine stain solution for 24 hr at 60°C, rinsed with 70% alcohol and mounted in 45% propionic acid following De8.

No significant effect of photoperiod on uredospore germination of P. arachidis was observed whereas temperature and pH greatly influenced its uredospore germination and infection structure development. The uredospores did not germinate at 14°C or 30°C while 3-7% of them germinated within 40-48 hr in pH 5.5 at 27°C but these germings remained nondifferentiated without undergoing any nuclear division and a septum was laid down between the two nuclei (figure 7).

Maximum germination was noticed at 20°C in water of pH 5.5 and in this optimal condition 84% of the spores germinated within 20-24 hr and formed infection structure. Host stimulus9, heat shock10 or nutrient11 was found to be essential for differentiation of germings of some rust fungi but these factors did not affect infection structure development of P. arachidis.

The uredospores were spherical to oval, yellowish brown, thick-walled, echinulate and contained 2 nuclei (figure 1). Single germ tube was produced by a spore (figure 2) into which both the nuclei of the uredospore migrated. No nuclear fusion was observed within the uredospores. Similar observations have been recorded by Chinnappa and Sreenivasan12. The germ tube extended into long, unbranched, aseptate hypha with rounded apical end, the protoplasm occupying a relatively constant volume at the tip of the germ tube, while the rest of it remained almost empty. After attaining a length of 2500 μ the germ tube ceased its forward growth. The apical portion of the germ tube containing cytoplasm and 2 nuclei became cut off from the rest of it by a septum. The process of 2 nuclei dividing mitotically to form 4 nuclei (figure 3) has also been reported in some other rust fungi12-14. The apical portion of the germ tube containing 4 nuclei gradually swelled (figure 4) to form quadrinucleate appressorium (figure 5). From the appressorium an infection peg developed, the tip of which swelled to form substomal vesicle. The 4 nuclei of the appressorium moved one after another into the substomal vesicle through the infection peg. After migration of all the 4 nuclei into the substomal vesicle a septum was laid down between the infection peg and the substomal vesicle (figure 6). In contrast to the observation of Grambow and Muller14 working with Puccinia graminis f sp tritici, further divisions of the 4 nuclei inside the substomal vesicle have never been observed. The 4 nuclei possibly migrated in pairs into the infection hypha, but this point could not be decided and needs further investigation.

1 July 1985; Revised 23 September 1985

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STUDIES ON NON-SPECIFIC ESTERASES IN SEBACEOUS GLANDS OF EXTERNAL PORTION OF VAGINA IN THE BAT, CYNOPTERUS SPHINX SPHINX

L. T. MOTE and C. N. KUMBHAR

M. J. S. Collge, Shrigonda 413 701, Ahmednagar district, India.

The phenomenon of lordosis is found in many vertebrates and for this reason secondary sexual characters