

Neurospora crassa

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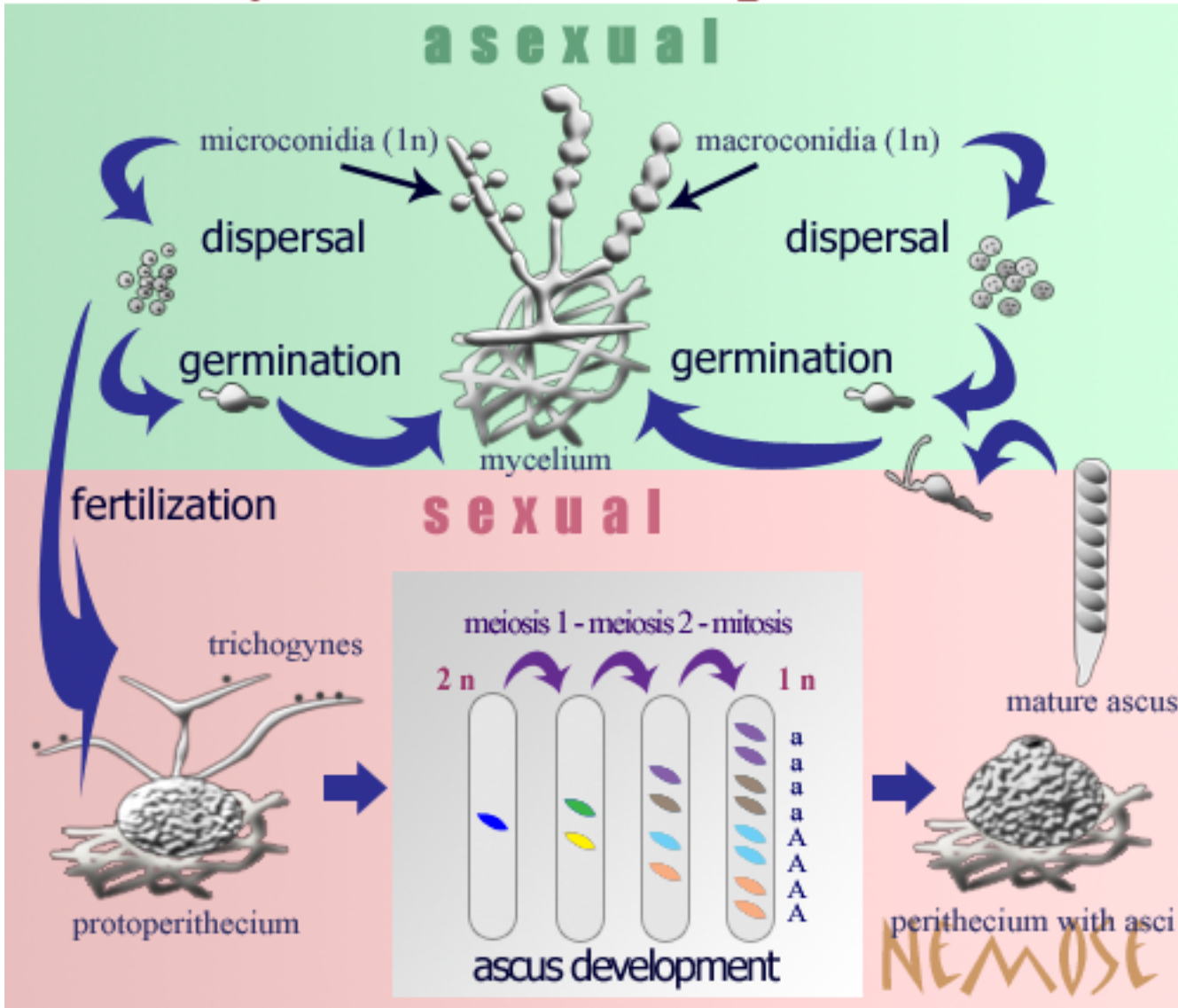
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Brief facts

- *Neurospora crassa* is a filamentous fungus, a bread mold, which in its natural environments can be found growing on dead plant matters predominantly in tropical and subtropical regions.
- *Neurospora crassa* is one of most important model organisms of our times. Most of its life stages are haploid which significantly simplifies genetic analysis. Research programs dedicated to *Neurospora crassa* focus on circadian rhythms, genetiss, gene silencing, ecology, evolution, and many other areas.

Life cycle of *Neurospora crassa*



Life cycle

Life Cycle Stages

- **asexual**

a haploid asexual spore (micro- or macroconidium) germinates and grows turning into multinucleated branched thread (hypha); a mass of hyphae constitutes a mycelium of the fungus colony; a colony buds off more conidia from aerial hyphae, and these disperse and repeat the asexual cycle

- **sexual**

in the heterothallic species *N. crassa*, colonies of opposite mating type, **A** and **a**, must interact to give the series of events resulting in fruiting body formation, meiosis, and the generation of dormant ascospores; only a single copy of a mating type sequence is present in a haploid genome; two strains of opposite mating type cannot form a stable heterokaryon during vegetative growth; instead, they fuse abortively to give a heterokaryon incompatibility reaction, which results in death of the cells along the fusion line

- **vegetative growth**

this is phase of growth of hyphae to form a mycelium not bearing fruiting bodies

Tissues

Fungal Components

- **conidium**

a vegetative spore; two types of conidial differentiation involve distinct developmental pathways, independent of each other

- **microconidium**

a uninucleate conidium; the microconidia can function either as spermatia (male gametes) or as asexual reproductive structures or both; in nature they probably function exclusively in fertilization of protoperithecia; unlike microconidia of some related ascomycetes, those of *Neurospora* are capable of germination, providing viable uninucleate haploid cells which are desired in several types of investigations

- **macroconidium**

a multinucleate conidium (blastoconidium and arthroconidium); macroconidia are produced in very large numbers and serve for asexual reproduction and distribution of the fungus; production of macroconidia happens once in ~24 hours (circadian rhythm) on aerial hyphae; namely these brightly pigmented structures were first recognized in 1843 on mouldy bread in bakeries of Paris; why does *Neurospora* employ a circadian mechanism for the formation of macroconidia that do not directly function in dissemination and survival? (ref. Maheshwari R., J Biosci. 2007)

- **mycelium MeSH**

a mass of branching, threadlike hyphae; mycelium can be in sexual state (bearing fruiting bodies) and in asexual state (growing biomass and producing conidia)

- **hypha MeSH**

threadlike filaments forming the mycelium of a fungus

- **aerial hypha**

hypha that raises above substrate and produces conidia

- **perithecium**

a fruiting body; a structure where nuclei of different mating types fuse resulting in transient diploid nuclei

which undergo meiosis

- ascospore

four haploid products of one meiosis undergoes a further mitotic division, resulting in an octad of eight ascospores enclosed in a sac called **ascus**

Mating types

The equivalent of the sex in lower organisms. The two mating types of *Neurospora* are determined by completely different DNA sequences at single chromosomal locus.

- mating type A

a strain of *N. crassa* that carries DNA sequence MAT A

- mating type a

a strain of *N. crassa* that carries DNA sequence MAT a

References

PubMed articles

- Maheshwari R. Circadian rhythm in the pink-orange bread mould *Neurospora crassa*: for what?. *J Biosci.* 2007 Sep; 32(6): 1053-8. **PMID: 17954967**
- Borkovich KA et al. Lessons from the genome sequence of *Neurospora crassa*: tracing the path from genomic blueprint to multicellular organism. *Microbiol Mol Biol Rev.* 2004 Mar; 68(1): 1-108. **PMID: 15007097**

- Maheshwari R. Microconidia of *Neurospora crassa*. *Fungal Genet Biol.* 1999 Feb;26(1): 1-18. **PMID: 15846337**
- Coppin E et al. Mating types and sexual development in filamentous ascomycetes. *Microbio Mol Biol Rev.* 1997 Dec;61(4): 411-28. **PMID: 9409146**
- Metzenberg RL, Glass NL. Mating type and mating strategies in *Neurospora*. *Bioessays.* 1990 Feb;12(2):53-9. **PMID: 2140508**
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Websites

- [The *Neurospora* Home Page](#)
- [Wikipedia: *Neurospora crassa*](#)



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