Aspergillus

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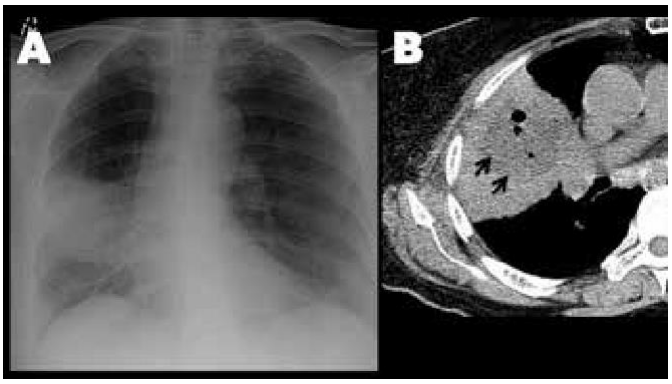
Clinical Presentation

Table 3.3: Types of Aspergillosis

Hypersensitivity	Colonisation	Superficial	Invasive

• Allergic bronchopulmonary aspergillosis (ABPA)
• Asthma
• Allergic rhinosinusitis
	• Aspergilloma	• Keratitis
		• Otomycosis
		• Sinusitis
		• Cutaneous
			• Pulmonary
			  • Aspergillosis (acute and chronic)
			  • Tracheobronchitis
			• Extrapulmonary
			  • CNS
			  • Endophthalmitis
			  • Endocarditis
			  • Osteomyelitis and arthritis

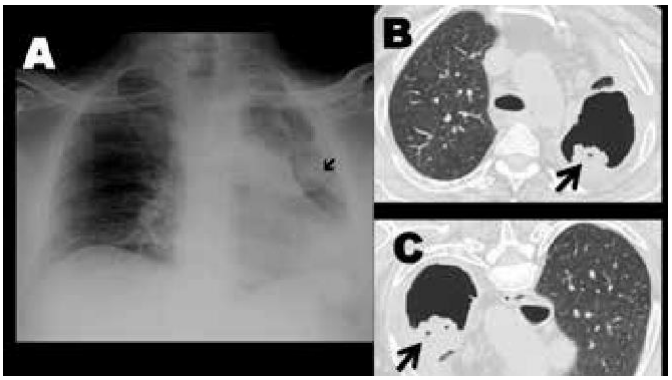
Invasive pulmonary aspergillosis — Fig. 3.2-1



A. Postero-anterior radiograph of 56-year-old female patient shows right middle lobe pneumonia, diffuse infiltrates in both lungs and halo sign.

B. Non-enhanced CT scan shows the centre of the consolidated lesion liquefying to turn into a thick-walled abscess (arrows). *Aspergillus* spp. was isolated from the pus aspirate.

Aspergilloma — Fig. 3.2-2

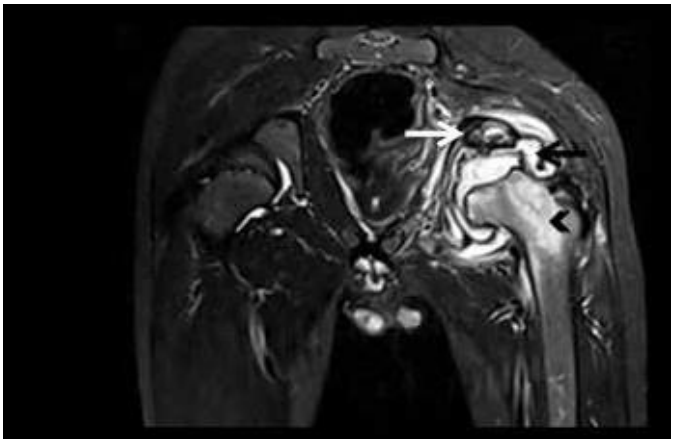


Middle-aged male patient with recurrent haemoptysis.

A. Postero-anterior radiograph shows a well-defined spherical thin-walled cavity in the left middle zone (arrow). Note clear “halo” around the opacity.

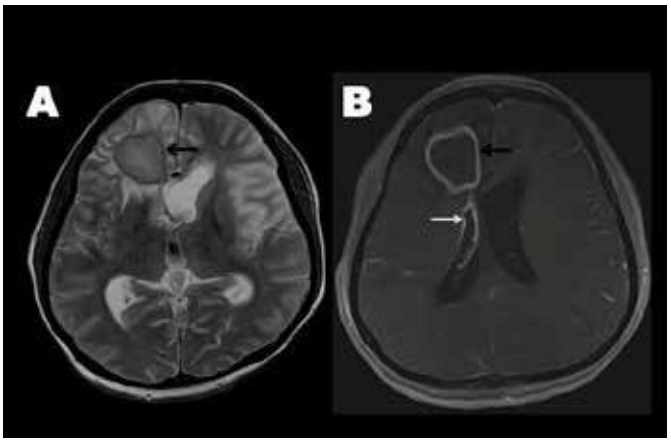
B (supine) and C (prone). Non-contrast CT chest in lung window settings. Free-lying soft tissue density ball in a cavity which changes position with gravity (arrow). Appearance consistent with aspergilloma (fungal ball) that occurs when inhaled conidia enter a pre-existing cavity in lung and germinate to form a solid ball of fungal mycelium. Rarely can lead to invasive disease.

Fungal arthritis and osteomyelitis — Fig. 3.2-3



A 10-year-old boy presented with history of painful swollen left hip and an inability to walk. Coronal inversion recovery (STIR) MR of both hips shows marrow edema involving the acetabulum and the proximal femur (arrow head), joint effusion (white arrow) and an intraosseous abscess in the roof of the acetabulum (black arrow). Compare with the normal right hip. Joint aspirate revealed growth of *Aspergillus* spp.

Brain abscess — Fig. 3.2-4

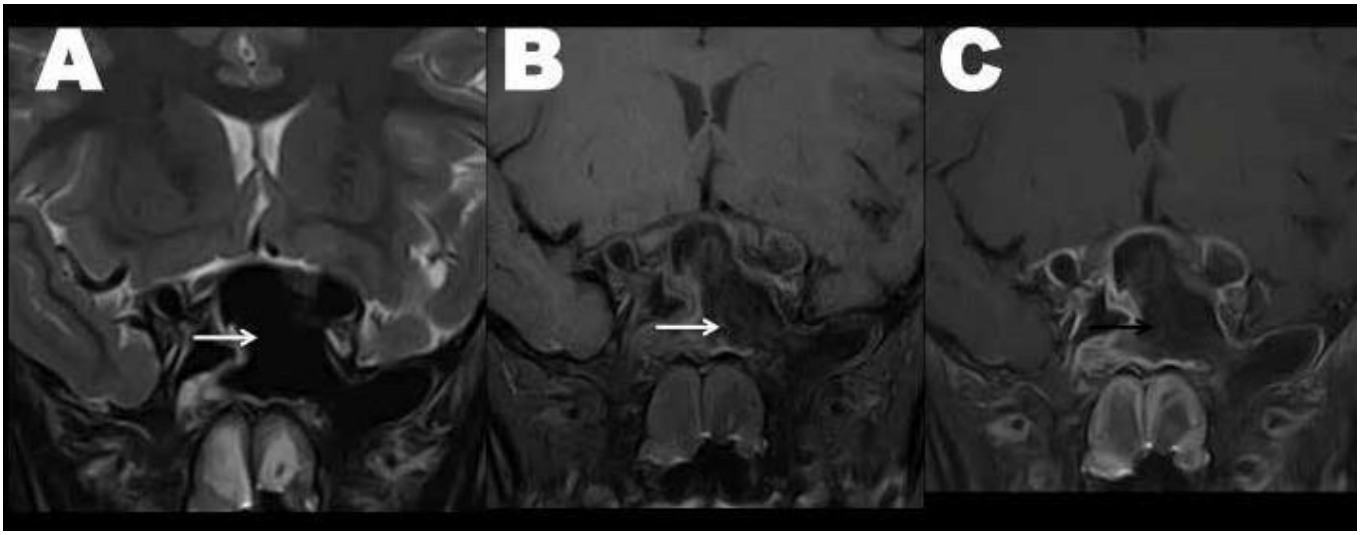


A 26-year-old female patient presented with headache and drowsiness.

A. Axial T2-weighted MRI of brain shows a well-defined low T2-signal lesion in the right frontal lobe with surrounding edema (arrow).

B. Axial contrast-enhanced T1-weighted MRI of brain shows marked peripheral enhancement (black arrow) as well as involvement of the left lateral ventricular lining (white arrow). Radiological findings are consistent with diagnosis of brain abscess with ventriculitis. Similar presentation with tuberculous infection. Both the CSF as well as the aspirate from the abscess had growth of *Aspergillus* spp.

Fungal sinusitis extending into intracranial space — Fig. 3.2-5

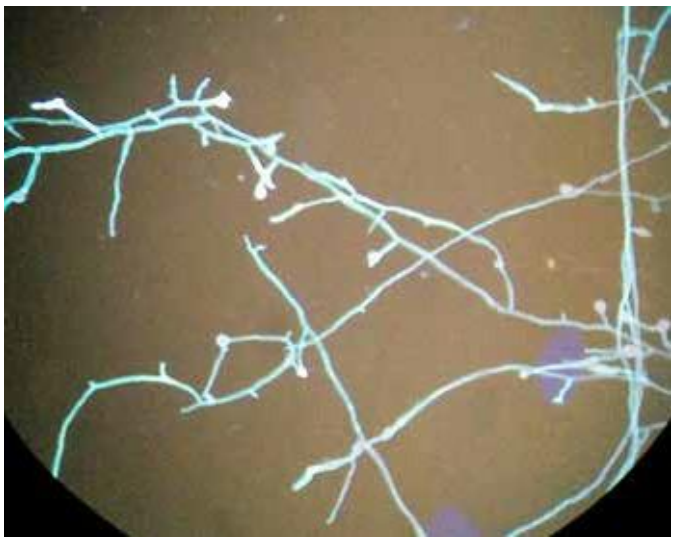


A 14-year-old boy with no known co-morbids presented with complaints of reduced vision in left eye and headcahes.

A. Coronal T2-weighted MRI scan shows an expanded sphenoid sinus bulging into the intracranial space. The sinus is filled with material which is profoundly low-signal on T2-weighted image resembling air (arrow).

B (pre-contrast) and C (post-contrast). Coronal T1-weighted scans shows intermediate signal from the mass (white arrow) with some enhancement (black arrow). This combination of a profoundly low signal on T2-weighted scan and intermediate signal on T1-weighted scan with enhancement is pathognomonic of fungal sinusitis secondary to an *Aspergillus* infection. Fungal sinusitis can be fatal and is mostly seen in tropical countries.

Keratitis, Calcofluor white stain Fig. 3.2-6



Corneal ulcer scraping shows hyphae. *Aspergillus*, mainly *A. fumigatus*, is an infrequent cause of infection of the cornea after trauma or corneal surgery. (x20)

A. fumigatus, 10% KOH wet mount smear Fig. 3.2-7

Septate hyphae seen in sputum. (x40)

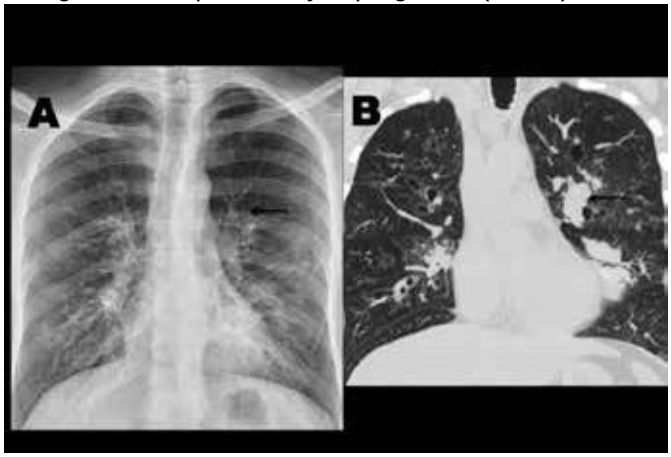
Cutaneous aspergillosis Fig. 3.2-8

A 32-year-old male patient presented with a 6-month history of asymptomatic flesh-coloured papules on trunk gradually increasing in number.

Cutaneous aspergillosis, close-up of skin papules Fig. 3.2-9

Culture shows growth of *Aspergillus* spp. Patient responded to treatment with itraconazole but was lost to follow-up.

Allergic bronchopulmonary aspergillosis (ABPA) Fig. 3.2-10



A 25-year-old female patient known asthmatic presented with an episode of haemoptysis.

A. Postero-anterior radiograph of chest shows central bronchiectasis with a dilated fluid-filled bronchus at the left hilum.

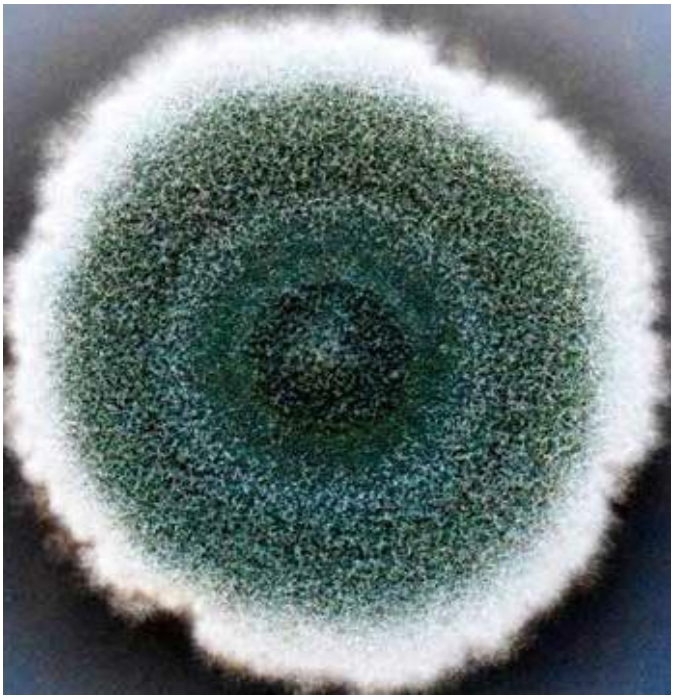
B. Coronal reformatted non-contrast CT of the

chest better delineates the extent of the central brochiectasis and the fluid-filled bronchus. Appearances consistent with ABPA.

Aspergillus fumigatus

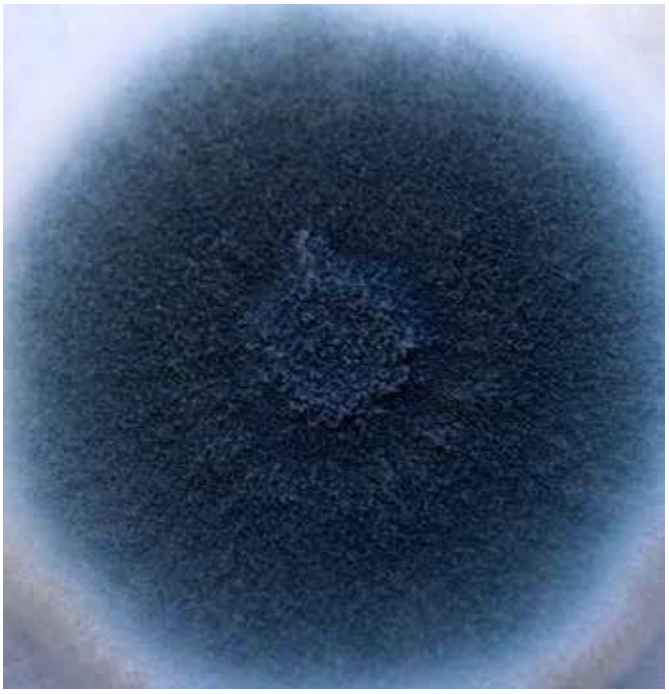
The most commonly isolated *Aspergillus* species typically found in soil and compost. *A. fumigatus* mold cause fatal acute pulmonary infection as well as chronic pulmonary infections and allergic bronchopulmonary aspergillosis. It is also the most common cause of invasive fungal infection in immunosuppressed individuals.

A. fumigatus, front view of culture on SDA — Fig. 3.2-11



Day 3, incubation at 37°C. Smoky grey-green and velvety-powdery growth.

A. fumigatus, front view of culture on PDA — Fig. 3.2-12

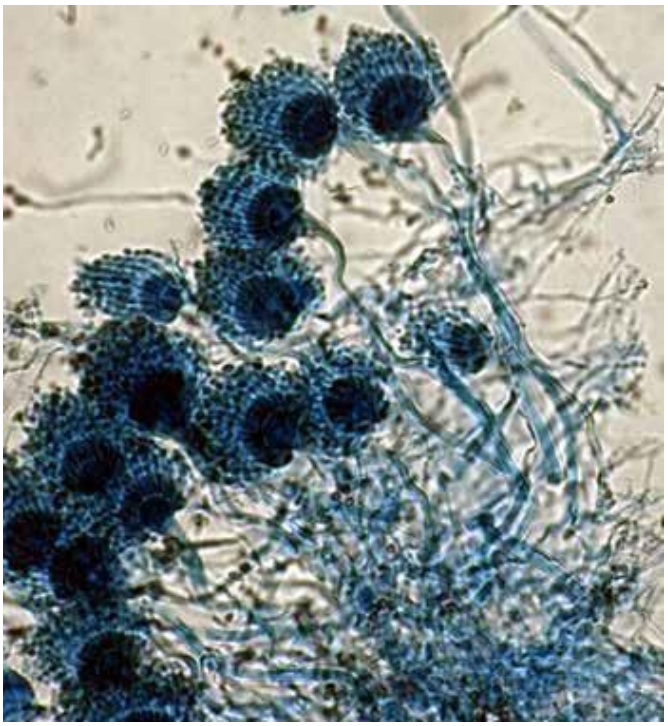


Day 3, incubation at 37°C. Smoky grey-green and velvety-powdery growth.

A. fumigatus, reverse view of culture on SDA — Fig. 3.2-13

Day 3, incubation at 37°C. White, pale yellow and tan

A. fumigatus, LPCB wet mount prep — Fig. 3.2-14



coloured colonies.

Septate hyphae, short conidiophore, flask-shaped vesicles, uniseriate phialides (only on upper two-thirds of vesicle) and columnar conidia. (x40)

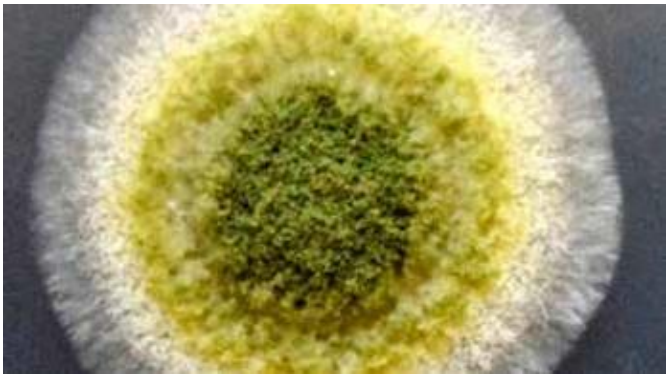
Aspergillus flavus

Mold found in warm humid soil as well as coloniser of nuts, seeds and legumes where it produces *A. flavus* toxin. It can cause the complete spectrum of aspergillosis. *A. flavus* is unique in its ability to be thermo-tolerant and be able to survive extremes of temperature.

A. flavus, front view of culture on SDA Fig. 3.2-15

Day 4, incubation at 37°C. Initial yellow growth which quickly turned bright to dark yellow-green, lime and olive-green.

A. flavus, front view of culture on SDA Fig. 3.2-16



Yellow to green coloured colonies.

A. flavus, reverse view of culture on PDA Fig. 3.2-17

Day 4. Tan to white on reverse.

A. flavus, reverse view of colony on PDA Fig. 3.2-18

Creamy white to yellow colour.

A. flavus, LPCB wet mount preparation Fig. 3.2-19

Septate hyphae, long conidiophore, uniseriate and (mostly) biseriate phialides, and numerous

conidia. (x40)

Aspergillus nidulans

A. nidulans, front view of culture on SDA — Fig. 3.2-20

Day 4, incubation at 37°C. Rapid growing velvety green to buff colonies.

A. nidulans, reverse view of culture on SDA — Fig. 3.2-21

Day 4, incubation at 37°C. Buff to brown reverse.

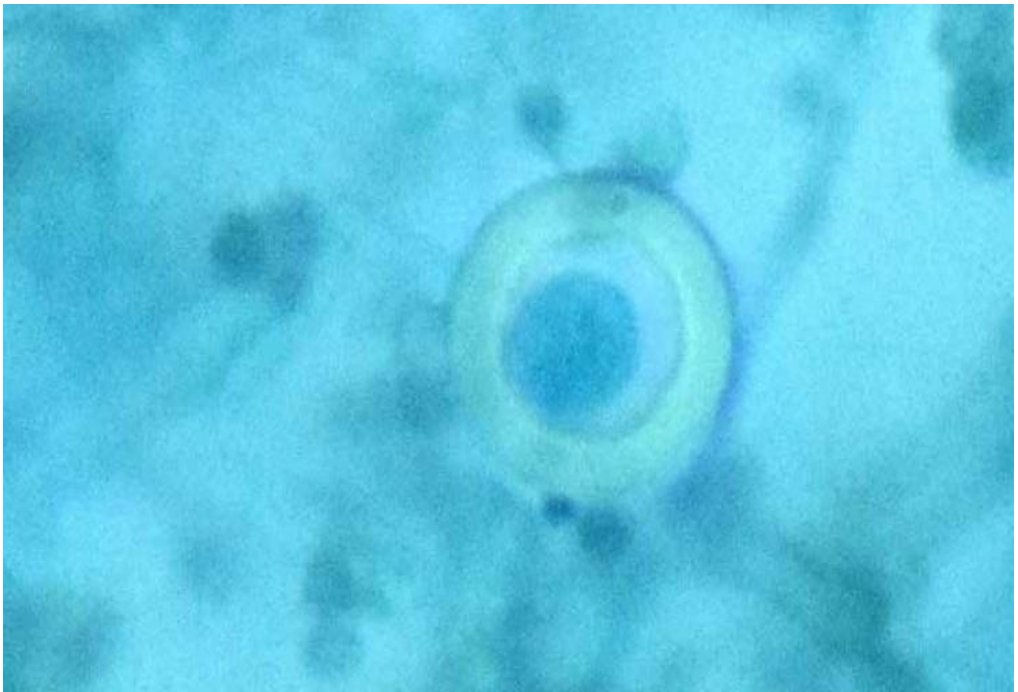
A. nidulans, LPCB wet mount preparation — Fig. 3.2-22

Smooth brown pigmented stalk, hemispherical vesicle with metulae and phialides. (x40)

A. nidulans, LPCB wet mount preparation — Fig. 3.2-23

Close-up of vesicle. (x40)

A. nidulans, LPCB wet mount preparation — Fig. 3.2-24



Thick-walled globose Hülle cells. (x40)

Aspergillus terreus

A. terreus is a mold commonly found in soil, compost and dust, and used industrially to produce organic acids and enzymes. Infection mostly manifests as otomycosis and onychomycosis as well as disseminated invasive disease.

A. terreus, front view of culture on SDA Fig. 3.2-25

Day 3, incubation at 37°C. Velvety tan to cinnamon brown growth.

A. terreus, reverse view of culture on SDA Fig. 3.2-26

Day 3, incubation at 37°C. Pale brown reverse.

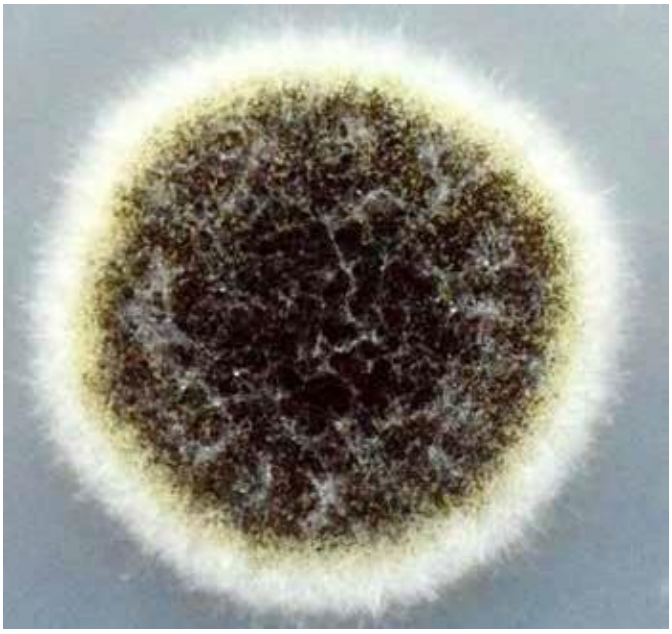
A. terreus, LPCB mount Fig. 3.2-27

Septate hyphae, relatively short conidiophore, biseriate phialides covering upper half of vesicle, and round and smooth conidia. (x40)

Aspergillus niger

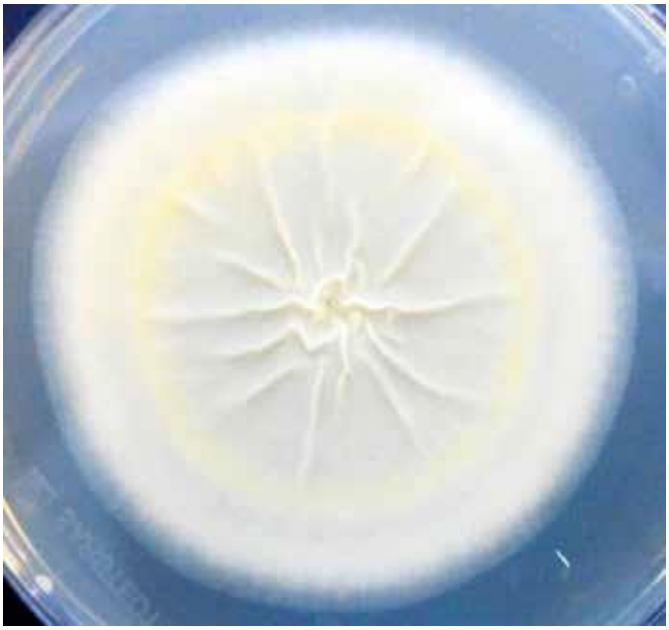
A. niger is a mold found in soil and indoor environment, affecting fruits and vegetables. It is one of the most common causes of otomycosis which can result in otalgia, hearing loss and at times permanent damage to tympanic membrane.

A. niger, front view of culture on SDA Fig. 3.2-28



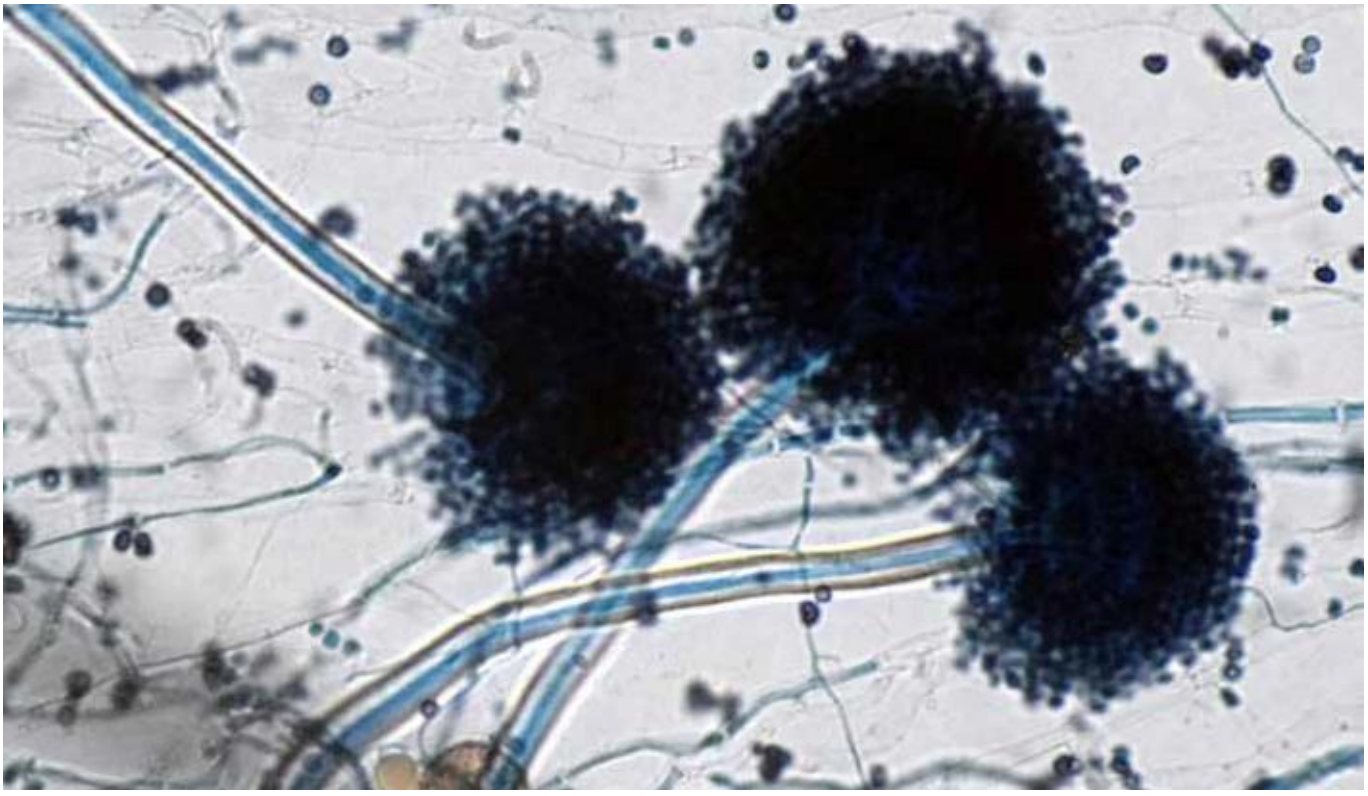
Day 3, incubation at 37°C. Surface granular in texture with whitish colouration that rapidly turned black at the centre.

A. niger, reverse view of culture on SDA Fig. 3.2-29



Day 3, incubation at 37°C. Creamy white to yellow surface.

A. niger, LPCB wet mount preparation Fig. 3.2-30



Three long conidiophores arising from septate hyphae. The central vesicles are completely covered with conidia. (x40)