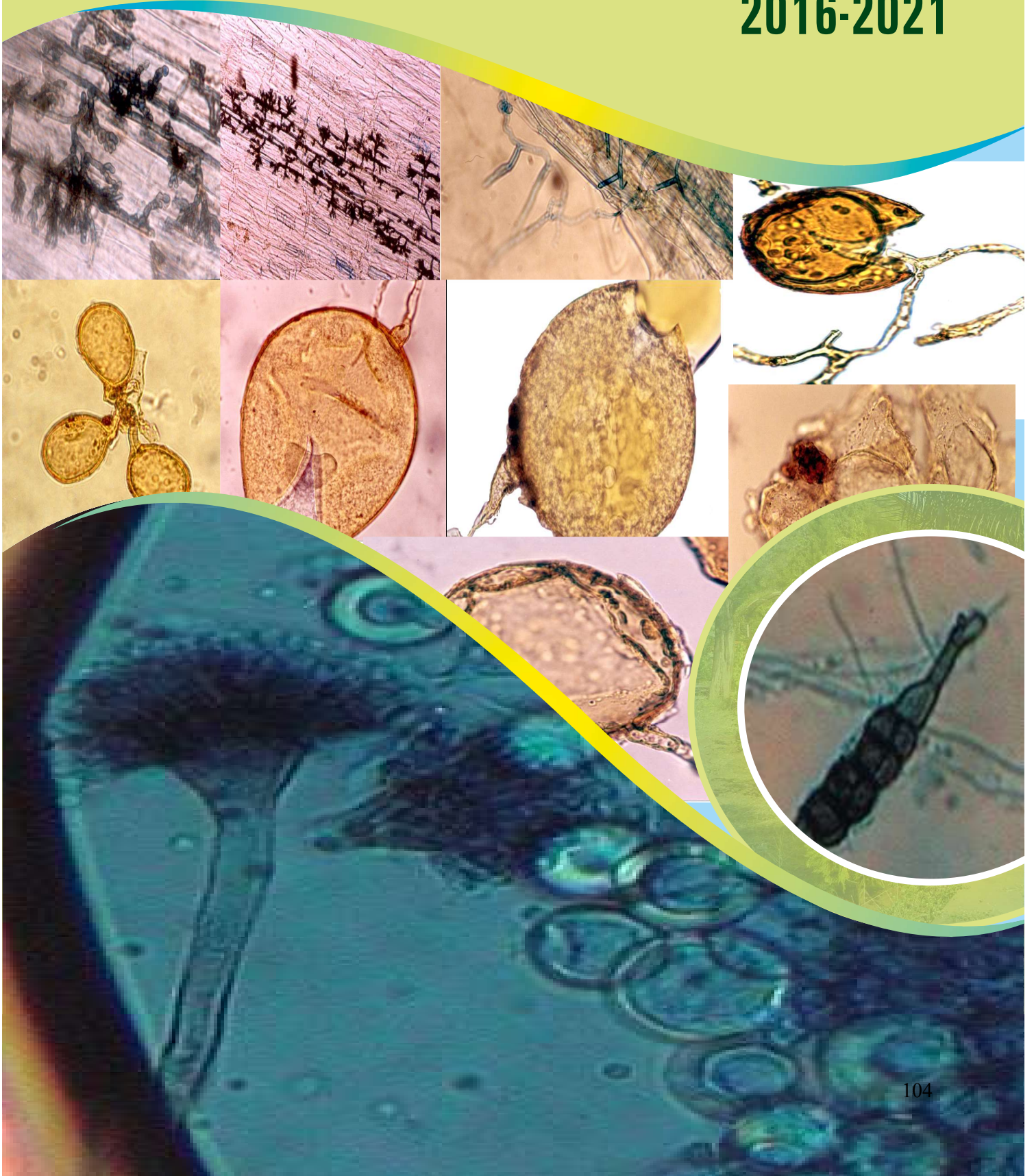


CHAPTER-7

SOIL AND THE SOIL MICROFLORA

2016-2021





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SOIL AND THE SOIL MICROFLORA

The soil, harbours millions of organisms, releases that flight of imagination which pictures the soil as a sort of Lilliputian Zoo in which some magic hand has eliminated all barriers and set free every grade of minute but a rapacious monster to go roaring after the next lesser grade as its lawful prey.

Directly or indirectly, the wastes of humans and other animals, their bodies, and the tissues of plants are dumped onto or buried in the soil. Somehow they all disappear, transformed into the substances that make up the soil. It is the microbes that make these changes, the conservation of organic matter into simple organic substances, that provide the nutrient material for the plant world. Thus microorganisms play a key role in maintaining life on earth. Soil has been defined as that region on the earth's crust where geology and biology meet. From a functional viewpoint, the soil may be considered as the land surface of the earth, which provides the substratum for the plant, animal and microbial life. The characteristics of the soil environment vary with locality and climate. Soils differ in-depth, physical properties, chemical composition and origin. Fertile soil is inhabited by the root system of higher plants, by many animal forms (e.g. rodents, insects and worms), and by tremendous numbers of microorganisms.

The vast differences in the composition of soils, together with their physical characteristics and the agricultural practices used for the cultivation of plants, resulting in large differences in the microbial population both in total numbers and in kinds.

Table-26: Soil nutrient analysis report:

Properties	Components	Unit	Result
Mechanical Analysis	Clay	%	36.10
	Silt	%	40.10
	Sand	%	23.80
Sand Particle Size	Coarce	%	0.0
	Silt	%	30.0
	Clay	%	70.0
Water Holding Capacity		%	30.43
Permeability		Cm/hrs.	4.640
Specific Density			2.37
TDS		%	0.185
EC (1:5)	Mill Mhos/cm	Micro Mhos/cm	0.600
pH			7.89
Available Macro Nutrients	N	Kg/He.	280



	P	Kg/He.	75
	K	Kg/He.	320
Elements	Ca	%	0.020
	Mg	%	0.015
	Na	%	0.0165
	K	%	0.0016
	Cl	%	0.068
Microelements	Fe		5.90ppm
	Zn		4.40ppm
	Mn		8.20ppm
Organic Carbon		%	1.25
Organic Matter		%	1.50

Table-27 : Soil fungi from university campus

Sl.no	Family	Species
1.	Acaulosporaceae	<i>Acaulospora longula</i>
		<i>Acaulospora denticulata</i>
		<i>Acaulospora scrobiculata</i>
2.	Chaetomiaceae	<i>Chaetomium species</i>
3.	Glomeraceae	<i>Glomus aggregatum</i>
		<i>Glomus arborensense</i>
		<i>Glomus cerebriforme</i>
		<i>Glomus etunicatum</i>
		<i>Glomus fasciculatum</i>
		<i>Glomus hoi</i>
		<i>Glomus intraradices</i>
		<i>Glomus citricola</i>
		<i>Glomus geosporum</i>
		<i>Glomus mosseae</i>
		<i>Glomus versiforme</i>
4.	<i>Hypocreaceae</i>	<i>Trichoderma hazarianum</i>
5.	Mucoraceae	<i>Mucor species Fresen</i>
		<i>Rhizopus species Ehrenb</i>
6.	Nectriaceae	<i>Fusarium oxysporum</i>



		<i>F. solani</i>
7.	Pleosporaceae	<i>Helminthosporium species Durieu & Mont</i>
		<i>Alternaria brassicicola Schweinitz</i>
		<i>Curvularia lunata Boedijn</i>
8.	Sparassidaceae	<i>Sparassis crispa</i>
9.	Trichocomaceae	<i>Aspergillus niger van Tieghem</i>
		<i>A. parasiticus</i>
		<i>A. nidulans G Winter</i>
		<i>A. oryzae Ahlburg E. Cohn</i>
		<i>A. flavus Johann Friedrich Heinrich</i>
		<i>A. fumigatus Fresenius</i>
		<i>A. versicolor (Vuill.) Tiraboschi</i>
		<i>A. terreus Thom</i>
		<i>Penicillium bilaiae Chalab</i>
		<i>P. crustosum Thom</i>
		<i>P. funiculosum Thom</i>
		<i>P. chrysogenum Thom</i>
		<i>P. purpurogenum Stoll</i>

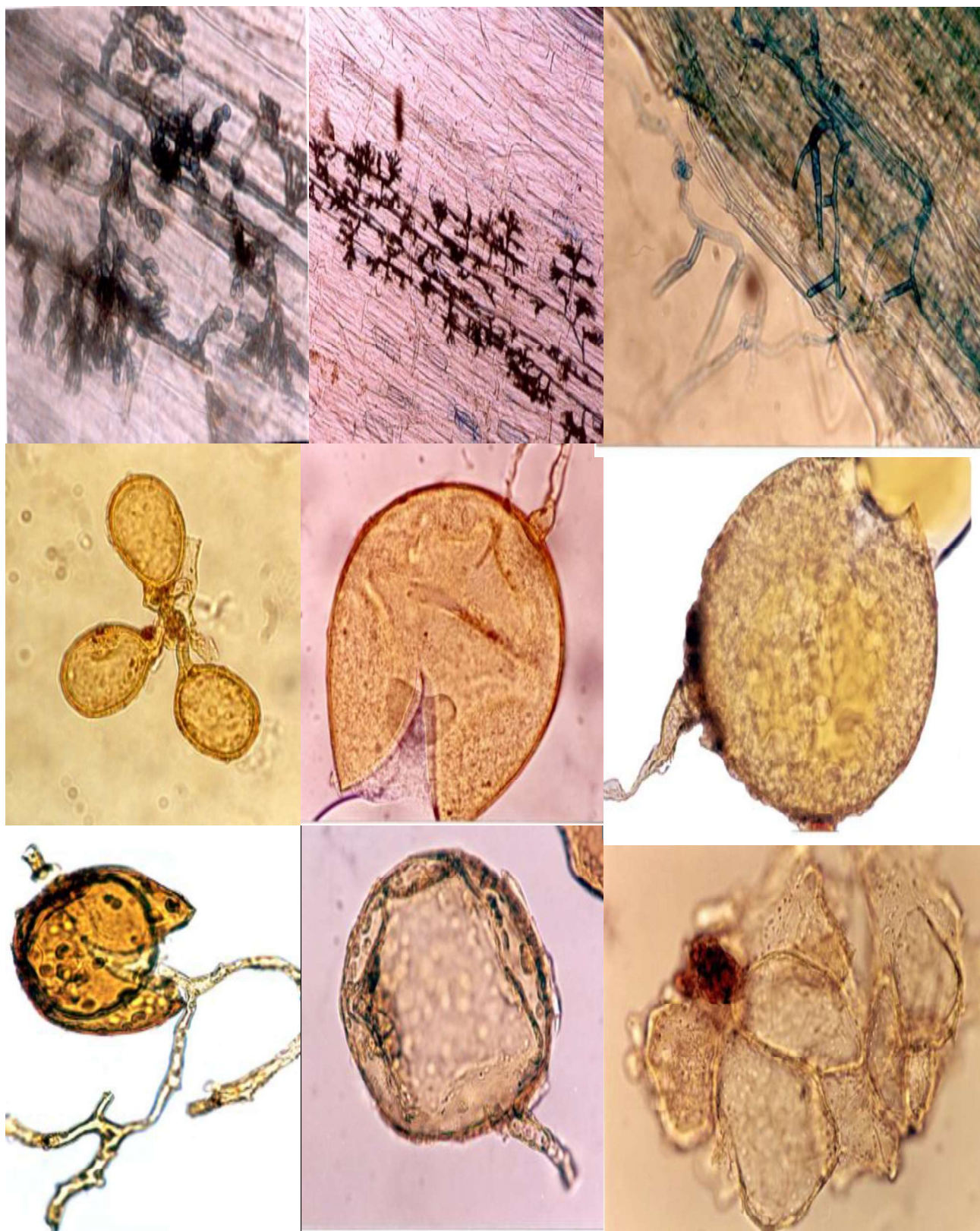


Figure 5 : AM fungi spores.

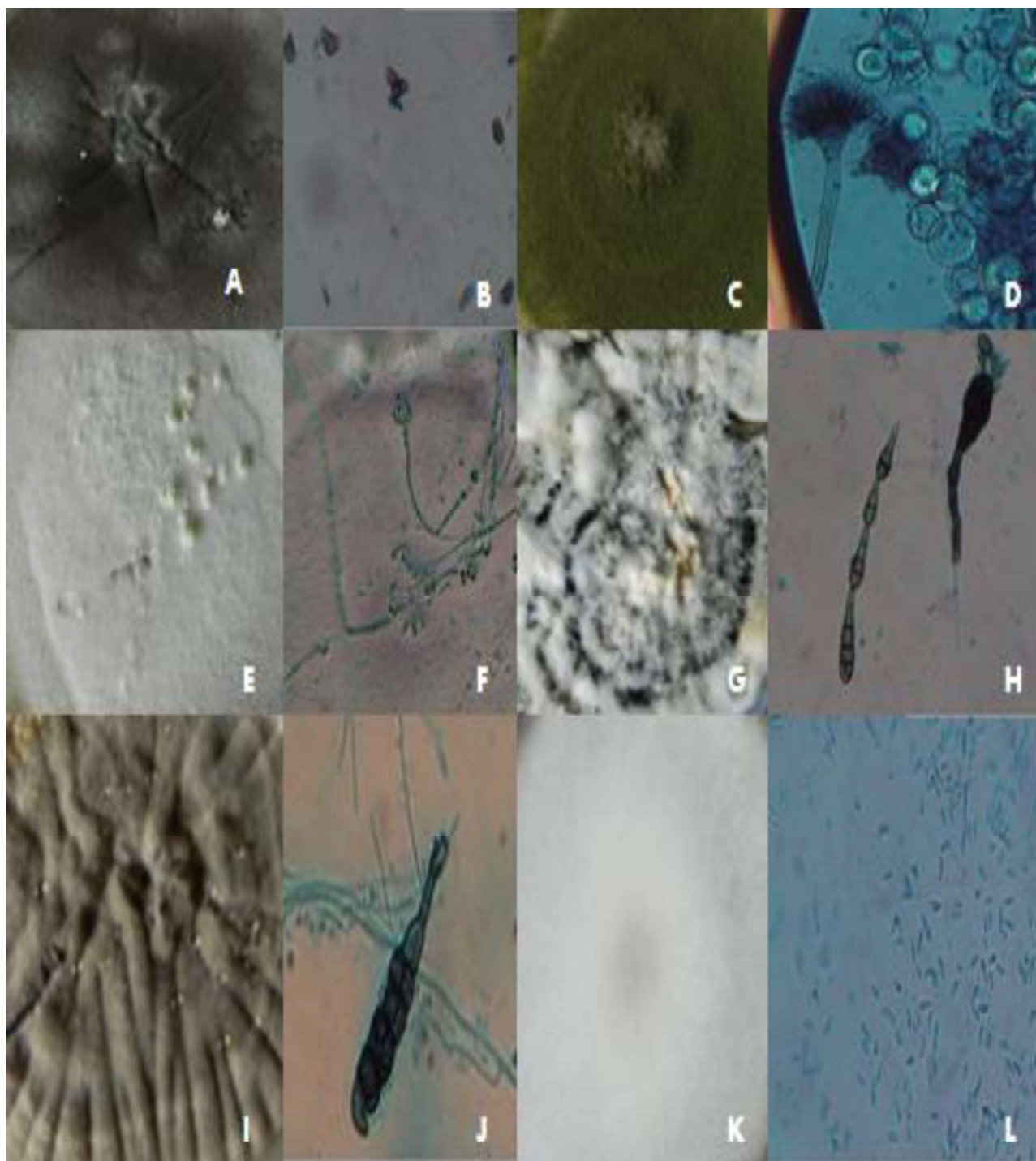


Figure 6: A- *Curvularia* sp, B- Conidia of *curvularia*;C- *Aspergillus flavus*, D- Conidiophores *Aspergillus* bearing conidia; E- *Trichoderma* spp, F- Conidiophores of *Trichoderma* bearing conidia; G- *Alternaria* sp, H- Conidial arrangement of *Alternaria*; I- *Helminthosporium* sp,J- Conidia of *Helminthosporium*; K- *Fusarium oxysporum*, L- Microconidia of *Fusarium oxysporum*

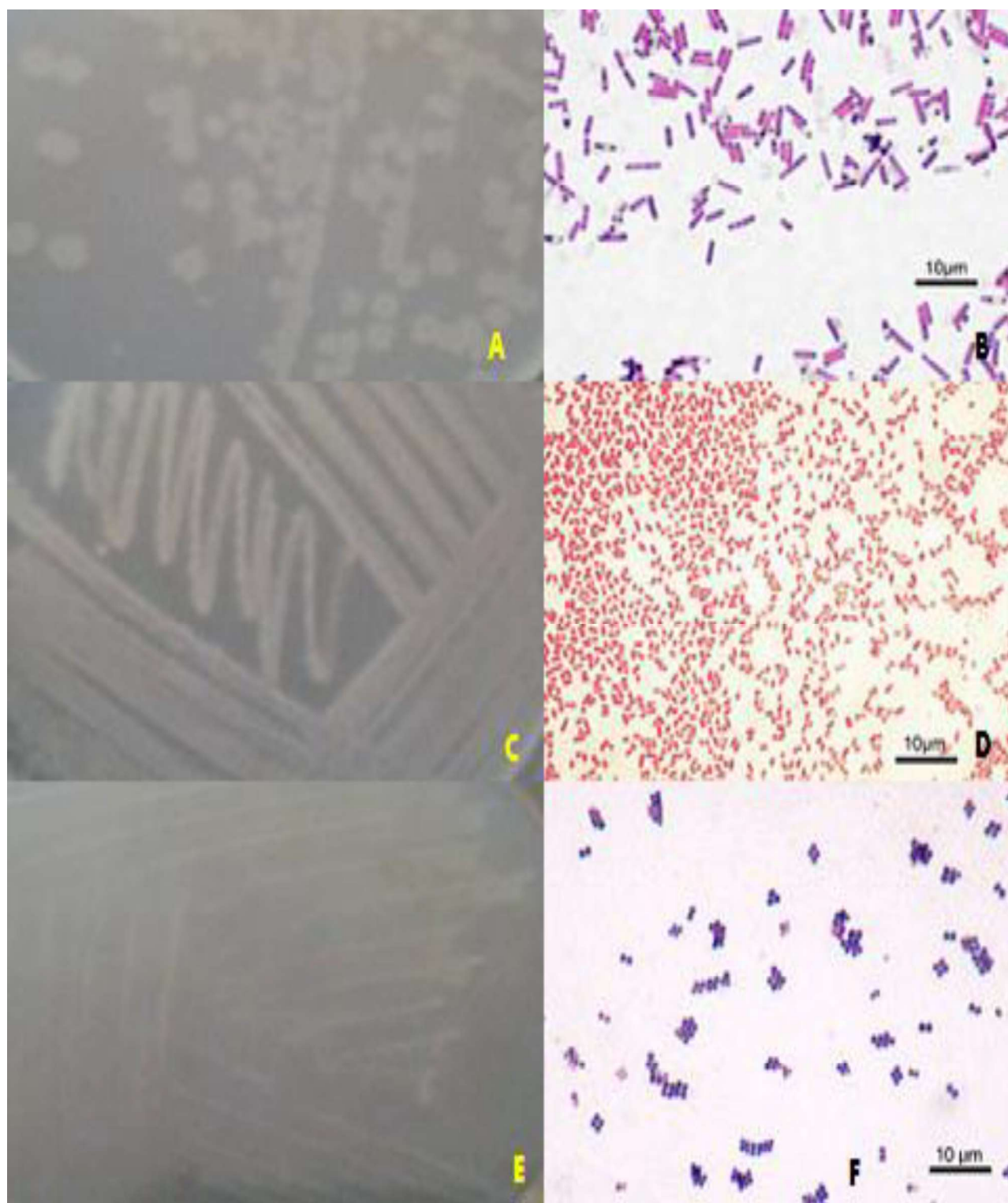


Figure 7 : A- *Bacillus subtilis*, B- *Bacillus subtilis*-Gram staining; C-*Pseudomonas aureginosa*, D-*Pseudomonas aureginosa*-Gram staining; E- *Staphylococcus aureus*, F-*Staphylococcus aureus*-Gram staining.