

concerning the life history of these pests, most of them being exceedingly minute.

GENERAL CHARACTERISTICS OF THE FUNGI.

The fungi include most of these parasites, that commence life from a spore which to some extent corresponds to a seed, the starting point for the higher forms of plant life, as the grape, etc. Spores are exceedingly small, most of them microscopic, have a very thin covering, germinate from no particular point, and have no embryo. Thus you will perceive they differ very materially from a seed, which is visible, has a well defined covering, germinates from a particular point, and contains an embryo, that develops into a plant capable of producing flowers and seeds.

The fungi also differ from other plants in having no green coloring matter (Chlorophyll) in them, and thus cannot elaborate food from inorganic material; they must derive their food from material elaborated by plants that do possess Chlorophyll. They therefore live on organic matter, some on dead, such as mushrooms, others on living, such as mildews, smuts, etc. The latter are true parasites, and are very injurious by sapping the vitality from the plants upon which they are found. Among these fungi we find four frequently parasitic upon the grape. Before discussing these specific forms, it may be of service to the reader to outline the usual development of a parasitic fungus from the germination of spore till spores are again produced. Spores being exceedingly small are readily transported by the wind, and soon reach a suitable place for germination upon some plant, which is termed the host. The minute germinal thread which at first appears soon penetrates the tissue of the host plant and continues growing among the cells, from the contents of which it derives nourishment. As growth proceeds, thread like structures (*hyphae*) increase, and usually form quite a complicated mass (*mycelium*) pervading the tissues of the affected plant. The growth of this has a very disastrous effect upon the plant attacked, by lessening its vitality and general growth. At the proper time certain structures arise from the mass (*mycelium*). These vary much in the different fungi; but all are concerned in the production of spores, which falling upon proper places and surrounded by favorable conditions, soon germinate and perpetuate the disease.

This first form of spore (Summer spore) is usually developed early in the season and in great numbers, their use being the rapid spread of the fungus. Their vitality is chiefly confined to the season in which they are produced; but later in the season, among the threads of the mass, more complicated structures appear. The elements they contain mingle together and give rise to much more durable spores (Winter spores) which are destined to carry the trouble into another season.