

as *Fusicladium dendriticum* (Wallr.) Fcl., is the active agent, the ascigerous stage being merely saprophytic, occurring on dead leaves. Nevertheless, it is mainly this saprophytic stage that spreads the disease afresh each season.

In early November black spots begin to appear on leaves and developing fruits, arising as a result of infection either from ascospores produced from perithecia formed in dead leaves or from conidia produced from stromata which have overwintered on shoots.

If a spore (ascospore or conidium) alights on a leaf or fruit surface, and conditions prove favourable, it germinates and produces a germ-tube, which penetrates the cuticle, beneath which it branches repeatedly to form a mycelium, which derives its nourishment from the solution of the cuticle and from cells of the epidermis or parenchyma lying immediately beneath. About a fortnight after infection this mycelium develops a stroma consisting of closely woven masses of hyphæ (Fig. 8, *st*); from it upright hyphæ (conidiophores) are produced, arranged in closely packed columnar masses (Fig. 8, *con*); on their apices the olive-coloured elliptical conidia are produced (Fig. 8, *sp*), being cut off in succession from the conidiophores. During the development of the stromata and conidiophores the cuticle is gradually forced away from the epidermis, and at this stage appears as a greyish border surrounding the spore masses (Fig. 3). The conidia are readily detached, and being light are carried by wind or other agency to neighbouring leaves or fruits, which in turn may become infected. Conidia remain viable for but a short time, so that subsequent infection must occur from conidia produced throughout the season from stromata on leaves, fruits, or shoots.

Infected leaves sooner or later fall to the ground, where they become permeated with the dark-coloured mycelium. In the autumn perithecia begin to form from this mycelium, but do not reach maturity until after the winter months, their development being completed in August and September. A perithecium is a flask-shaped receptacle the walls of which are formed of closely woven hyphæ (Fig. 9). In its early stages it is filled with hyphal filaments, certain of which later develop into asci (Fig. 9, *a*), each containing eight two-celled ascospores.* The ascospores at first are colourless and unicellular, but at maturity they become unequally septate and yellowish-green in colour (Fig. 10, *as*). During development the perithecium is completely buried within the leaf, but as it reaches maturity it approaches the leaf-surface until the neck, which is perforated with a minute opening (the ostiolum, Fig. 9, *os*), pierces the epidermis and opens on to the free surface (usually the lower) of the leaf. As the perithecium matures, the neck, which is at first smooth, becomes crowned with a few coarse black bristles (Fig. 9, *br*). Perithecia, as a rule, develop only on leaves that have been somewhat protected during the winter months; leaves found under hedges, clods, &c., contain numerous

* Prior to the formation of the perithecium sexual union occurs. This is a device on the part of the organism to prevent degeneration, and doubtless plays an important part in the production of an actively parasitic strain.