

A NEMATODE-STRANGLING DACTYLELLA WITH BROAD QUADRISEPTATE CONIDIA

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(WITH 2 FIGURES)

In earlier papers I have described under the binomials *Trichothecium polybrochum* (6: 535-538), *Arthrobotrys dactyloides* (6: 482-487), *Dactylella doedycoides* (8: 448-456), *Dactylella heterospora* (9: 339-349), *Dactylella bembicodes* (6: 487-492), and *Dactylaria brochopaga* (6: 514-518) six species of clampless nematode-capturing hyphomycetes which among predaceous fungi are especially remarkable through their utilization of stout hyphal rings by whose forcible contraction the prey is not only held securely but is at the same time strangled so severely that disablement soon follows, permitting early intrusion of assimilative filaments into the fleshy body. From resemblances in mycelium and asexual reproductive parts it is obvious that these species are closely related to one another as well as to a greater number of other clampless hyphomycetes likewise subsisting by capture of eelworms but using predaceous devices not operating in any large measure through constriction. To the same taxonomic kinship are manifestly referable also several forms that prey on amoebae (4), testaceous rhizopods (3, 5, 7), or insects (11). The predaceous apparatus employed by these forms in no instance operates by strangulation. Attack by strangulation is likewise wholly unknown in either of the two mainly terrestrial series of animal-capturing fungi taxonomically alien to the clampless hyphomycetes; such forcible attack not having come to light in the two nematode-capturing species of the clamp-bearing genus *Nematoctonus* (13), nor among the many predaceous members of the Zoöpagaceae, four

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of which are known to prey habitually on nematodes (12). Like the predaceous members of *Nematoctonus* and of the Zoöpagaceae the rotifer-capturing saprolegniaceous form *Sommerstorffia spinosa* Arn. (1) employs only adhesive organs in taking prey. However, occasional strangulation of rotifers in the constricting rings of *Dactylella bembicodes* has been recorded by both Couch (2: 309; pl. 27, fig. 14) and myself (6: 487, 488, 491, 492; 537, fig. 18, N); and subsequently I have observed rotifers captured also in the constricting rings of *Arthrobotrys dactyloides* and *Dactylaria brocho-paga*.

A seventh species intimately akin to the six enumerated above, and displaying the same astonishing manner of capturing motile eelworms, recently made its appearance in a maize-meal-agar plate culture which after being permeated with mycelium of *Pythium arrhenomanes* Drechsl. had been further planted with a small quantity of friable leaf mold kindly supplied by R. K. Zuck, who gathered it from the floor of a beech (*Fagus grandifolia* Ehrh.) wood near Webster, N. Y., on September 20, 1945. The fungus was first noted 28 days after the forest detritus had been added. As the predaceous mycelium at the time extended scarcely 10 mm. out from the deposit of opaque material its development into the transparent agar could hardly have begun more than three or four days earlier. Considerable delay in extensive development could well have been occasioned by the originally hard consistency of the agar medium. Owing to this firm consistency movement of eelworms under the surface of the culture was naturally repressed until prolonged bacterial action had brought about noticeable softening; and until subsurface movement of prey took place freely the constricting rings of the new fungus, which like those of the six species previously described are commonly produced in submerged positions (FIG. 1, A; B, a), could have had only meager opportunity for effective operation. Whenever the fungus was transplanted to fairly soft agar cultures abundantly infested with eelworms, it has always been prompt in extending its predaceous mycelium in all directions.

The constricting rings of the New York fungus bear a close general resemblance to those of the six strangulating species described earlier. They are borne on relatively straight mycelial filaments

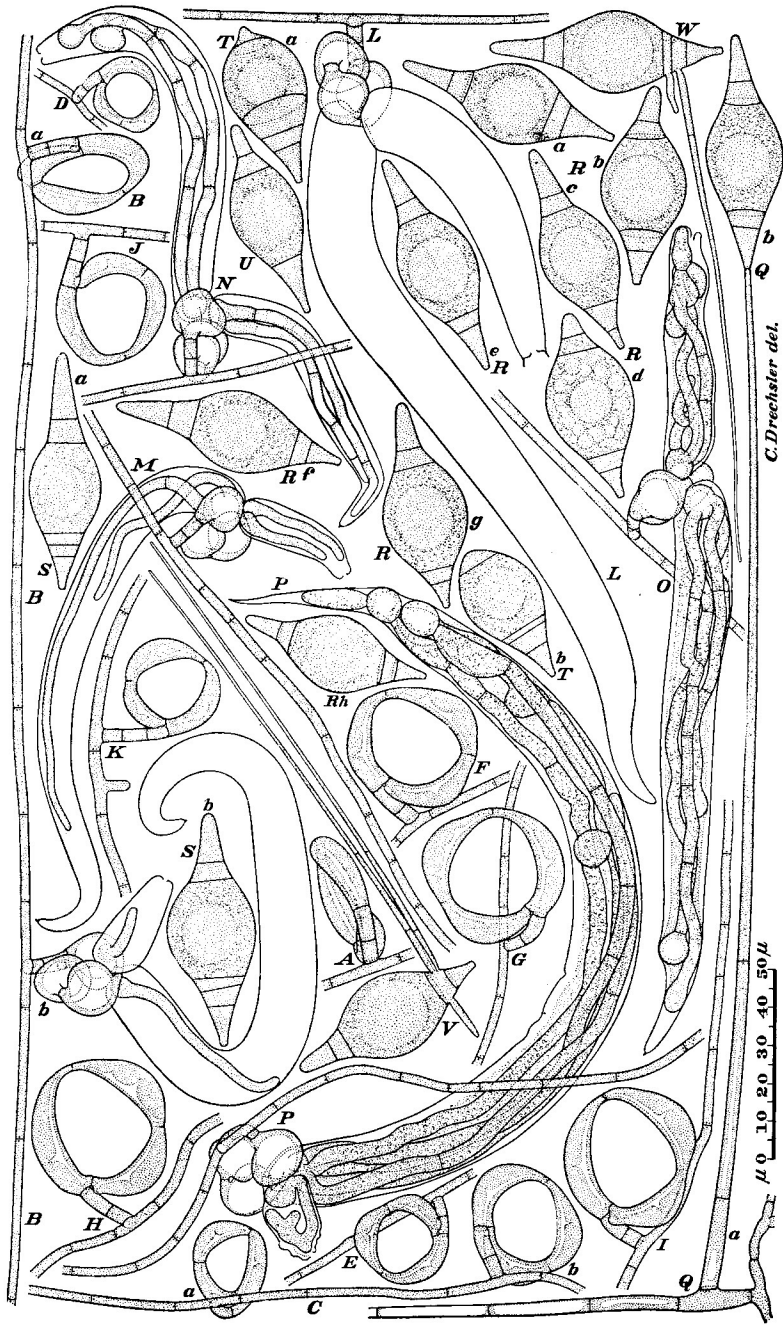


FIG. 1. *Dactylella coclobrocha*.

at intervals varying commonly from $25\ \mu$ (FIG. 1, *C, a, b*; FIG. 2, *A, a, b*) to more than $200\ \mu$ (FIG. 1, *B, a, b*). They are formed usually in a plane making a right angle with the parent filament (FIG. 1, *A; B, a*), and consequently in their original posture are usually seen edgewise or nearly edgewise. However, many of them later come to be directed flatwise to the observer, mainly from being jostled sideways by largish specimens of the nematodes they are designed to capture; and these displaced examples then more advantageously reveal the arrangement of their component cells. They are attached to the parent filament by a sturdy, usually two-celled stalk (FIG. 1, *C, a, b; D-J*; FIG. 2, *A, a, b; B-F*), and are made up regularly of three arcuate segments; the distal arcuate segment, as a rule, being fused both to the distal end of the second stalk cell and to the proximal end of the first arcuate segment (FIG. 1, *C, a, b; D-I; K*; FIG. 2, *A, a, b; B-F*). In somewhat exceptional instances the third arcuate segment may be anastomosed only with the second stalk cell (FIG. 1, *J*); or, again, the stalk may consist of three cylindrical cells (FIG. 1, *K*). The rings vary considerably with respect to size; the aperture in the smaller ones sometimes measuring only $12\ \mu$ across (FIG. 1, *D*), whereas in the larger ones it may measure $29\ \mu$ or $30\ \mu$ in greatest width (FIG. 1, *H*). Closure of the ring is accomplished, much as in rings of the six allied species, through contraction and centripetal swelling of the three arcuate cells (FIG. 2, *G*).

Despite their general resemblance to the rings of other species the predaceous organs of the New York fungus offer some modifications distinctive enough to merit attention. On the whole their component segments display somewhat more pronounced median thickening than the arcuate segments in allied forms. Further, the inner contour of the ring usually shows more pronounced curvature near the ends of the constituent cells than in their middle portions; so that the aperture here tends rather more strongly toward a rounded triangular outline than in other species. Yet, though the middle portion of the cell may show only slight curvature along the inner contour of the ring, it commonly lacks the curious median bulge whereby the aperture, particularly in rings of *Dactylella doedycoides* and *D. heterospora*, is given a scalloped outline suggestive, for example, of the trefoil ornamentation used

in architecture. In the present species, it is true, some perceptible modification in the outline of the aperture is often brought about by a slight bulging of the anastomosing connection between the proximal and distal arcuate segments. However, neither this connection nor the commonplace septal connection between the second and third arcuate cells shows much that could be held especially distinctive of the species. But the connection between the proximal and median arcuate cells presents marked peculiarity in narrowing to a width of 1.5 to 2.5 μ —to a width, therefore, often scarcely equivalent to one-third or one-fourth of the greatest width of the arcuate cells in question. Usually the narrowing of the two cells toward the septum dividing them is somewhat gradual, so that the connection often appears as a slender isthmus several microns long. In young predaceous organs capable of functioning vigorously the cross-wall in such an isthmus is often not clearly visible; the portion of the septum near the inner contour of the ring, together with the cell wall bordering the aperture, being, as a rule, wholly indiscernible to ordinary microscopical scrutiny. For that matter the other two transverse partitions in the ring likewise frequently fade from view in proximity to the inner contour, and even in proximity to the outer contour stand out less distinctly than the homologous partitions in related forms.

Since in predaceous organs that have closed, and in organs too old to function effectively, the cell membrane bounding the aperture, as also the cross-walls, appears much as in the similar organs of allied forms, there is reason to presume that the poor visibility of these membranous parts derives less from physical characteristics proper to them than from unusually dense consistency of the protoplasm in contact with them. The appearance of the bordering protoplasm, certainly, is suggestive of exceptional density. Besides, whereas the ring segments in the several other species are generally found occupied throughout with protoplasm of rather homogeneous aspect, in the New York fungus they show what would seem to be a narrow elongated vacuole extending longitudinally through them for nearly their entire length. When the open ring is viewed flatwise this vacuole is most often seen following a course more or less parallel to the concave boundary of the arcuate segment, usually at a distance of 1 to 2 μ from that

boundary. Over most of its length the vacuole commonly maintains a width of about $1\ \mu$, but near the middle of the segment it usually widens out markedly in extending a wedge-shaped arm toward the outer contour of the ring (FIG. 1, *C, a, b; E; I; J; FIG. 2, A, a, b; C; F*), and in many segments the vacuole has two or three such arms (FIG. 1, *F-H; FIG. 2, B*). Occasionally the vacuole follows a more crooked course and then may in places lie nearly midway between the inner and outer boundaries of the ring segment (FIG. 1, *K; FIG. 2, E*). In segments where the vacuole occupies its more usual position, the denser protoplasm that tends to make membranous structures appear indistinct is localized especially in the narrow layer bordering the inner contour of the ring. After closure of the ring the swollen segments each reveal a large spherical vacuole (FIG. 1, *B, b; L-P; FIG. 2, G*) which could well have been formed from the elongated vacuole present earlier. However, as in the six allied species the swollen segments show similar internal organization, it is not evident that the elongate vacuole in the New York fungus causes any distinctive modification in the arrangement of cell contents after contraction has taken place.

The narrowed cord-like connection between the first and second arcuate segments makes for a curious modification in the operation of the predaceous organ. While in the six other strangulating species all three cells composing the ring press their broadened bulk directly into the animal's body and thus squeeze it with about equal violence from three sides, in the New York fungus the captured nematode is usually found gripped only by the first two cells, which in their swollen condition are interposed between the captive and the distal cell. As a rule the swollen portions of the first and second cells seem less deeply indented into the animal's body than are the three swollen cells of allied forms; strangulation here evidently being brought about for the most part through deep narrow indentation of the fleshy body by the slender cord-like connection. Manifestly the slender connection serves altogether in a passive manner. The pull whereby it constricts the eelworm so severely is supplied through the contraction of all three arcuate segments, for the distal cell obviously loses little in mechanical effectiveness from lack of direct contact with the captive. Since

the pressure put on one side of the animal by the swollen parts of the first and second cells is applied over a wider region than the opposing pressure exerted on the other side by their slender connection, both the forward and backward portions of the nematode are often abruptly bent away from the closed ring (FIG. 1, *B, b; L; N; P*). Consequently the captured animal, which here is commonly gripped near the periphery rather than in the center of the ring, shows more often than captives strangled by allied forms an unnatural angular posture resembling a little the posture usually taken in the hangman's noose. With this unpleasant device, indeed, the predaceous organ under consideration would seem to have some measure of real similarity.

When from increasing disablement the struggles of a captured nematode have been largely quieted, the two swollen cells directly in contact with the animal will push delicate processes through its integument into the underlying tissue; the processes after some enlargement growing lengthwise through musculature and organs (FIG. 1, *B, b; M*) until the fleshy interior is occupied from head to tail by assimilative hyphae (FIG. 1, *N-P*). Small slender eelworms measuring about $200\ \mu$ in length and 10 to $12\ \mu$ in width are usually permeated forward and backward by two such hyphae (FIG. 1, *M, N*), whereas stouter specimens measuring about $300\ \mu$ in length and 18 to $20\ \mu$ in width commonly reveal no less than four (FIG. 1, *P*). Branching of the assimilative filaments occurs, in the main, close to their origin from the swollen cells, but occasionally may also be observed in more remote positions. In most though not in all assimilative filaments the distal segment undergoes globose swelling (FIG. 1, *N*), and rather often the second cell from the tip, together at times with the third cell, likewise becomes distended in varying measure (FIG. 1, *O, P*). Similar terminal enlargement of absorptive hyphae was noted earlier in the allied strangulating species *Arthrobotrys dactyloides*. After completing their growth the assimilative filaments form additional cross-walls until they are divided into segments of only moderate length. During the period they are most active in appropriating the globuliferous degenerating contents of the animal host their protoplasm shows numerous small globules (FIG. 1, *O, P*). When the host materials approach exhaustion the hyphal contents become less and less globu-

liferous. Finally, after increasing vacuolization (FIG. 1, *N*), the remnants of nearly homogeneous fungus protoplasm are withdrawn from the assimilative elements by way of the swollen cells of the closed ring into the parent mycelial filament.

A tract of predaceous mycelium amply nourished through expropriation of many eelworms will usually soon put forth scattered conidial apparatus. Rather tall conidiophores, generally similar to those of *Dactylella bembicodes*, though appreciably more slender, are produced, some in groups of two or three (FIG. 2, *H*, *a-c*), others singly at variable distances from their fellows (FIG. 1, *Q*; FIG. 2, *I-K*). Although the shorter conidiophores (FIG. 2, *H*, *a*, *b*; *J*) often measure only about 200 μ in length, the taller ones frequently attain a height of 450 μ (FIG. 2, *H*, *c*) and occasionally a height exceeding 500 μ . In some instances they produce their usually single conidium without forming any cross-wall above the septum regularly delimiting them at the base (FIG. 2, *I*), but more often one or two additional septa are deposited proximally (FIG. 1, *Q*; FIG. 2, *H*, *a-c*; *J*; *K*). Production of conidia plurally, either through subterminal branching or through renewed apical elongation after development of the first spore, seems relatively infrequent. However, when conidiophores that have produced a conidium fall over on the moist substratum, they often send up individually a new conidiophore from one of their stout basal cells (FIG. 1, *Q*), while the slenderer distal portions, if not previously evacuated of contents, usually grow out vegetatively like ordinary mycelial hyphae.

The conidia of the New York fungus are of the large broad type which, though unusual among the Mucedinaceae generally, is characteristic of many nematode-capturing hyphomycetes, including, indeed, four of the six constricting species made known earlier. With respect to septation and cellular make-up they differ decisively from the conidia of any of these four strangulating forms. In strong contrast to the uniseptate condition prevalent in spores of *Trichothecium polybrochum* and to the biseptate condition most common in the large conidia of *Dactylella doedycoides* as well as of *D. heterospora*, and in fairly pronounced contrast also to the triseptate condition typical of *D. bembicodes*, they show most frequently a symmetrically quadrisepate partitioning whereby the cell in median or penultimate position greatly exceeds the others with

respect to length, width, and volume (FIG. 1, *Q*, *b*; *R*, *a-h*; FIG. 2, *H*, *d-f*; *L*, *a-u*). Where abundant sporulation, accompanied by a high degree of uniformity in size and shape, gives ample assurance of normal development, 100 conidia chosen at random, whether from a nematode-infested culture or from a pure culture on maize meal agar, are usually found to include eighty to eighty-five quadrisepate specimens whose distended middle segment is much larger than the two cells below it or than the two cells above it. In cellular make-up these quadrisepate conidia thus show similarity to the five-celled conidia of approximately equal length that predominate in the nematode-capturing hyphomycete I have referred (6: 492-496) to *Dactylella ellipsospora* Grove (14). However, whereas in this hyphomycete, which captures its prey by means of stalked adhesive knob-cells, the four smaller segments of symmetrically quadrisepate conidia differ rather little with respect to length, in the New York fungus the parabasal and penultimate segments are nearly always conspicuously shorter than the basal and apical segments. Further, the large median cell widens more pronouncedly in the New York fungus than in the knob-bearing species, giving the conidium a more strongly ventricose outline and a greater measurement in transverse diameter. The data on conidial dimensions included in the diagnosis below were derived from 100 symmetrically quadrisepate specimens taken at random in abundantly sporulating material. The 100 measurements for length, expressed in the nearest integral number of microns, showed a distribution as follows: 46 μ , 1; 47 μ , 2; 48 μ , 7; 49 μ , 3; 50 μ , 4; 51 μ , 13; 52 μ , 15; 53 μ , 8; 54 μ , 14; 55 μ , 6; 56 μ , 6; 57 μ , 4; 58 μ , 5; 59 μ , 1; 60 μ , 1; 61 μ , 4; 62 μ , 4; 63 μ , 1; 64 μ , 1; whereas the values for greatest width were distributed thus: 18 μ , 2; 19 μ , 6; 20 μ , 18; 21 μ , 40; 22 μ , 18; 23 μ , 7; 24 μ , 6; 25 μ , 3.

Among the conidia (FIG. 1, *S-U*; FIG. 2, *M-P*) not conforming to the symmetrically quadrisepate type most characteristic of the species, some are divided by five cross-walls into six cells; the additional cell appearing most often as a short segment between the short parabasal and massive antepenultimate segments (FIG. 1, *S*, *a*, *b*; FIG. 2, *O*), though occasionally it occurs in antepenultimate position directly above the massive cell (FIG. 2, *P*, *a*, *b*). More pronouncedly unsymmetrical septation is found in some quadrisepate

conidia where the massive cell lies in penultimate position above three smaller proximal cells (FIG. 1, *T*, *a*, *b*). Now and then a conidium contains only three cross-walls, with the massive cell either in penultimate (FIG. 2, *M*) or in antepenultimate (FIG. 1, *U*) position, but in such instances, especially where the spore is of good size, the septation observed cannot always be regarded as definitive. The scattered biseptate conidia in which the massive cell commonly occupies a median position between a small basal cell and a small apical cell (FIG. 2, *N*) likewise invite suspicion as to their maturity.

In many cultures a large proportion—sometimes virtually all—of the conidia, while still borne aloft on the erect conidiophores, will give rise, mostly from the short parabasal segment, to delicate filamentous outgrowths in numbers commonly ranging from one to three (FIG. 1, *V*, *W*; FIG. 2, *Q*, *R*). As a rule these outgrowths are mostly simple and project out at approximately right angles to the longitudinal axis of the spore, yet some of them bear proximally a branch oriented parallel to the spore axis (FIG. 2, *Q*). Though commonly only 1.8 to 2.5 μ wide at the base they taper upward in easily noticeable degree; so that in well developed specimens 125 to 200 μ long a distal portion of considerable length may measure only 0.6 to 0.8 μ in width. When left undisturbed they usually keep a conspicuously stiff straight posture despite their unusual delicateness. Whereas the shorter outgrowths most often appear continuous throughout with the conidial segment from which they arise, those of greater length frequently contain one or two cross-walls in their stouter basal portions.

When conidia with small apical and basal segments fall on a moist substratum, they soon germinate by putting forth two germ hyphae about 2.5 μ wide; one of the hyphae being extended usually from the region immediately bordering the slightly flattened base, the other from the rounded apical region (FIG. 2, *S*, *T*). Production of a germ hypha from the usually small parabasal segment happens only occasionally, as, for example, in instances where the large massive cell is found in terminal position (FIG. 2, *U*). The presence of one or more finely tapering outgrowths on the parabasal segment does not seem to abate the general preference for bipolar germination (FIG. 2, *V*, *W*). Germ tubes from fallen co-

nidia anastomose freely with neighboring mycelial filaments (FIG. 2, X, Y); and, indeed, hyphal fusions of all sorts occur no less abundantly here than elsewhere in the series of clampless predaceous hyphomycetes. Much as in allied forms, again, conidia frequently send up a robust conidiophore whereon a secondary conidium is produced (FIG. 2, Y).

Emission of filamentous outgrowths from conidia that are still held aloft on the erect conidiophores is not at all infrequent among the other broad-spored nematode-capturing species of *Dactylella*, nor among the broad-spored predaceous species of *Dactylaria* such as *Dactylaria thaumasia* Drechsl. (6: 518-523) and *Dactylaria psychrophila* Drechsl. (10: 154-166). In these related species the outgrowths tend usually to intergrade more or less indistinguishably with germ hyphae and germ conidiophores. Although similar intergradation is observable likewise in the present fungus, the outgrowths here often become so distinctively differentiated that they present much the general appearance of setose appendages of the type familiar, for example, in *Alternaria Solani* (Ell. & Mart.) Sorauer.

The fungus was readily isolated by transferring conidia from erect conidiophores in nematode-infested cultures to poured plates of sterile agar medium; the transfer being accomplished conveniently by touching the tips of the conidiophores with a slice of agar held on a flamed platinum spatula. In pure culture on maize meal agar a fairly dense submerged mycelium develops, which, owing to haphazard arrangement of the component filaments, is without the luster characteristic of *Arthrotrix dactyloides* and *Dactylaria brochopaga* when cultivated under similar conditions. As many of the finer branches given off by the larger hyphae ramify rather extensively, the submerged mycelium offers a somewhat more delicate appearance than would seem commensurate with the fairly robust character of the conidial apparatus which after several days becomes macroscopically visible, together with interspersed aerial vegetative hyphae, as a scanty arachnoid web.

In view of the curiously vacuolate condition of the arcuate cells making up its predaceous organs the fungus is described under a specific epithet compounded of two words meaning "hollow" and "noose," respectively.

Dactylella coelobrocha sp. nov.

Mycelium effusum; hyphis hyalinis, septatis, plerumque 1.4–5 μ crassis, hic illic ex ramulis bilocularibus (raro trilocularibus) vulgo 10–18 μ longis et 2.5–4.2 μ crassis laqueos circulares 20–40 μ latos proferentibus qui in 3 cellulis arcuatis 14–40 μ longis medio 3.5–8.5 μ crassis consistunt et foramen rotundum vel rotundo-triangulum 12–30 μ latum circumdant; cellulis in extremis fere coarctatis, copula inter primam et secundam praesertim angusta et plerumque tantum 1.5–2.5 μ crassa; quaque arcuata cellula in lato foramen juxta vacuolum elongatum habente; vermiculo nematodeo in laqueum apertum errato omnibus tribus cellulis arcuatis abrupte se contrahentibus tumentibusque, animal vulgo inter primam et secundam arripientibus, captivum copula angusta magnopere comprimentibus, id ita ad modum laquei carnificis necantibus, his duabus cellulis mox integumentum ejus perforantibus, hyphas inter evolventibus quae carnem exhauriunt; hyphis assumptibus mediocriter septatis, magnam partem 2.5–5 μ crassis sed saepius in cellulas 5–8 μ crassas abeuntibus. Hyphae fertiles incoloratae, erectae, prope basim 1–3 septatae, vulgo simplices, plerumque 200–500 μ altae, basi saepius 4–6 μ crassae, sursum leniter attenuatae, apice saepe 1.5–3 μ crassae, conidia singula ferentes, quandoque recrescentes et aliud conidium gignentibus. Conidiis incoloratis, plerumque late fusiformibus, medio valde inflatis, 2–5 septatis, saepissime 4 septis in 5 cellulas divisus tali modo ut cellula media (antepaenultima) multo grandior quam aliae sit, tum plerumque ex toto 46–64 μ (saepius circa 53.7 μ) longis et 18–25 μ (saepius circa 21.2 μ) crassis, cellula infima 5.4–13.7 μ (saepius circa 8.2 μ) longa, cellula secunda 2.6–5.7 μ (saepius circa 4.3 μ) longa, cellula media 21.4–30.8 μ (saepius circa 25.4 μ) longa, cellula paenultima 2.8–6.8 μ (saepius circa 4.5 μ) longa, cellula summa 6.7–15 μ (saepius circa 11.3 μ) longa; quandoque omnibus cellulis glabris, quandoque cellula secunda praecipue 1 usque 5 appendices filiformes ad pares angulos emittente; appendicibus incoloratis, rectis, aliquid rigidis, continuis vel prope basim 1–2 septatis, plerumque 50–200 μ longis, basi 1.8–2.5 μ crassis, sursum attenuatis, apice 0.6–0.8 μ crassis.

Vermiculos nematodeos diversos (*Plectum parvum* et species *Rhabditis* et *Wilsonematis* inter alia) capiens consumensque habitat in foliis *Fagi grandifoliae* putrescentibus prope Webster, New York.

Mycelium spreading; vegetative hyphae colorless, septate, mostly 1.4 to 5 μ wide, often especially in presence of nematodes producing mostly underneath and in perpendicular positions approximately circular rings measuring 20 to 40 μ in outside diameter and composed individually of three arcuate cells 14 to 40 μ long, 3.5 to 8.5 μ wide in the middle—the first and third of the cells regularly being united to each other as well as to the distal end of a somewhat curved two-celled (rarely three-celled) supporting stalk commonly 10 to 18 μ long and 2.5 to 4.2 μ wide; all three cells narrowing toward their delimiting septa, but the connection between the first and second being especially narrow, often measuring only 1.5 to 2.5 μ in width; each cell having an elongate vacuole, mostly near

the side bordering the ring aperture; this aperture being of circular or rounded triangular shape, and varying from 12 to 30 μ in greatest width. After entrance of a nematode into the ring aperture all three arcuate cells abruptly contracting and swelling, thereby gripping the animal usually between the first and second cells, and through deep constriction brought about mainly by strong pull on the narrow cord-like connection strangling the captive somewhat as in a hangman's noose; the two cells then perforating the integument and extending lengthwise through the animal assimilative hyphae for the most part 2.5 to 5 μ wide but often terminating in cells 5 to 8 μ wide. Conidiophores colorless, erect, containing one to three cross-walls mostly in the basal portion, usually unbranched, commonly 200 to 500 μ high, 4 to 6 μ wide at the base, tapering gradually upward, often 1.5 to 3 μ wide at the tip, there bearing a single conidium and sometimes, on renewed elongation, a second conidium. Conidia colorless, mostly broadly fusiform and strongly ventricose in the middle, containing two to five septa, but most often divided by four cross-walls into five cells in such wise that the middle dolioform cell is much larger than the others,—then mostly 46 to 64 μ (average 53.7 μ) long and 18 to 25 μ (average 21.2 μ) wide, with the basal cell measuring often 5.4 to 13.7 μ (average 8.2 μ) in length, the parabasal cell 2.6 to 5.7 μ (average 4.3 μ), the median cell 21.4 to 30.8 μ (average 25.4 μ), the penultimate cell 2.8 to 6.8 μ (average 4.5 μ), and the apical cell 6.7 to 15 μ (average 11.3 μ); appendages sometimes wholly absent, but at other times present in numbers from one to five, usually arising from the short parabasal cell at right angles to the spore axis, colorless, filiform, straight, rather rigid, continuous or with one or two cross-walls in the basal portion, mostly 50 to 200 μ long, 2 to 2.5 μ wide at the base, tapering upward to a width of 0.6 to 0.8 μ in the distal portion.

Capturing and consuming nematodes of different species (*Plectus parvus*, *Rhabditis* spp., and *Wilsonema* sp. among others), it occurs in decaying leaves of *Fagus grandifolia* near Webster, N. Y.

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EXPLANATION OF FIGURES

FIG. 1. *Dactylella coelobrocha*; drawn to a uniform magnification with the aid of a camera lucida; $\times 500$ throughout. *A*, portion of hypha bearing a predaceous ring in normal position. *B*, mycelial hypha bearing two predaceous rings, *a* and *b*; one of the rings, *a*, being open and approximately in normal position; the other ring, *b*, having closed on a specimen of *Plectus parvus* and intruded two young assimilative hyphae into its body. *C*, portion of mycelial hypha bearing two open predaceous rings, *a* and *b*, oriented flatwise. *D-I*, portions of mycelial hyphae, each bearing an open predaceous ring oriented flatwise; the several rings collectively showing usual variations in size and shape. *J*, portion of mycelial hypha with a predaceous ring oriented flatwise; the distal arcuate segment here being attached only to the distal cell of the stalk, not to the proximal arcuate segment. *K*, portion of mycelial hypha with a predaceous ring oriented flatwise; the stalk consisting of three segments. *L*, portion of mycelial hypha bearing a predaceous ring that has closed on a specimen of *Wilsonema* sp. *M*, portion of mycelial hypha bearing a predaceous ring that has closed on a specimen of *Plectus parvus*; from the ring two assimilative hyphae are growing forward, and two others are growing backward through the fleshy body. *N*, portion of hypha with a predaceous ring that has closed on a specimen of *Plectus parvus*; the two assimilative hyphae extending forward like the two others extending backward have become strongly vacuolate as the host contents ap-

proached exhaustion; the two assimilative hyphae extending forward show the expanded terminations usual for the species. *O*, portion of mycelial hypha with a predaceous ring that has closed on a specimen of *Plectus parvus*; all the longer assimilative hyphae have swollen terminations. *P*, portion of hypha with a predaceous ring that has closed on a specimen of *Rhabditis* sp.; the four assimilative hyphae extended backward in the animal terminate individually in one to three distended segments. *Q*, prostrate hypha that has given rise to an erect conidiophore, *a*, whereon is borne a quadriseptate conidium, *b*. *R*, eight quadriseptate conidia, *a-h*, of the symmetrical cellular make-up most usual for the fungus. *S*, two quinqueseptate conidia, *a* and *b*, each with its swollen antepenultimate cell placed above three small proximal cells. *T*, two quadriseptate conidia, *a* and *b*, in which the massive cell is found in penultimate position. *U*, triseptate conidium whose massive cell lies between two smaller distal cells and a smaller basal cell. *V*, conidium whose parbasal cell bears three appendages, of which two are stiff and hair-like. *W*, quinqueseptate conidium bearing a filamentous appendage on its parbasal cell and a short hyphal outgrowth on the discoid third cell.

FIG. 2. *Dactylella coelobrocha*; drawn to a uniform magnification with the aid of a camera lucida; $\times 500$ throughout. *A*, portion of hypha bearing two open predaceous rings, *a* and *b*, which are turned flatwise. *B-F*, portions of mycelial hyphae, each with an open predaceous ring turned flatwise; the several rings collectively showing usual variations in size and shape. *G*, predaceous ring that has closed without capturing an eelworm. *H*, group of three conidiophores, *a-c*, bearing the solitary conidia *d-f*, respectively; owing to lack of space the conidiophore *c* is shown in parts whose proper continuity is indicated by broken lines. *I-K*, denuded conidiophores. *L*, twenty-one quadriseptate conidia, *a-u*, of the symmetrical cellular composition most usual for the fungus. *M*, small triseptate conidium whose largest cell lies between two small proximal cells and a small apical cell. *N*, small biseptate conidium with its massive cell in median position. *O*, quinqueseptate conidium wherein the massive antepenultimate cell is placed above three smaller proximal cells. *P*, two quinqueseptate conidia, *a* and *b*, wherein the massive cell is placed between two small proximal cells and three small distal cells. *Q*, large quinqueseptate conidium whose small parbasal cell bears two long, stiff setose appendages, one of which is branched near the base. *R*, small triseptate conidium whose parbasal cell bears a single setose outgrowth. *S*, *T*, quadriseptate conidia of symmetrical make-up, each germinating by production of a germ tube from each end. *U*, biseptate conidium which, owing to lack of a small apical cell, is putting forth a germ tube from the small parbasal cell as well as from the small basal cell. *V*, bipolar germination of a symmetrically quadriseptate conidium bearing a setose outgrowth on its small parbasal segment. *W*, bipolar germination of a symmetrically quadriseptate conidium bearing two long setose outgrowths on its small parbasal cell. *X*, conidium that has put forth a germ tube from near each of its ends, both germ tubes having very soon fused with mycelial hyphae nearby. *Y*, a fallen conidium whose apical cell has put forth a young erect conidiophore as well as a vegetative germ tube that soon anastomosed with a mycelial filament; owing to lack of space the conidiophore is shown in parts whose proper continuity is indicated by broken lines.