

Zeitschrift: Acta Tropica
Herausgeber: Schweizerisches Tropeninstitut (Basel)
Band: 8 (1951)
Heft: 3

Artikel: Analyse des Infektionsverlaufes bei *Ornithodoros moubata* (Murray) und der natürlichen Uebertragung von *Spirochaeta duttoni*
Autor: Burgdorfer, W.
Bibliographie: Literaturverzeichnis
DOI: <https://doi.org/10.5169/seals-310349>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. [Siehe Rechtliche Hinweise.](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. [Voir Informations légales.](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. [See Legal notice.](#)

Download PDF: 14.05.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

den Zeckenbiß allein als auch durch die Abgabe infektiöser Coxalflüssigkeit erfolgen kann (vgl. Abb. 20 D), und zwar übertragen

1. Zeckennymphen

a) durch den *Biß*, wobei die Spirochaeten mit dem Speichel direkt in die Wunde injiziert werden.

b) durch die *Coxalflüssigkeit*, wobei die Erreger in die Bißwunde geschwemmt werden oder durch die unverletzte Haut eindringen können.

2. Adultzecken

a) durch die *Coxalflüssigkeit* (wie oben)

b) durch den *Biß* via Speicheldrüsensekret (selten).

Literaturverzeichnis.

- Boné, G. (1938 a). Mode de transmission du spirochète de Dutton par les *Ornithodores moubata*. — C. R. Soc. Biol., vol. 129, p. 901-903.
- Boné, G. (1938 b). L'infection des *Ornithodores moubata* par le spirochète de Dutton. — C. R. Soc. Biol., vol. 129, p. 903-905.
- Boné, G. (1939 a). L'excrétion des spirochètes de Dutton chez *Ornithodoros moubata*. — C. R. Soc. Biol., vol. 130, p. 84-85.
- Boné, G. (1939 b). La transmission héréditaire du spirochète de Dutton chez *Ornithodoros moubata*. — C. R. Soc. Biol., vol. 130, p. 86-87.
- Boné, G. (1939 c). Contribution à l'étude de la transmission de la fièvre récurrente tropicale (premier mémoire). — Ann. Soc. belge Méd. trop., t. XIX, N° 3, 56 pp.
- Boné, G. (1943). Recherches sur les glandes coxales et la régulation du milieu interne chez l'*Ornithodoros moubata*, Murray. — Ann. Soc. Roy. Zool. de Belgique, t. LXXIV, p. 16-31.
- Buchner, P. (1951). Endosymbiose der Tiere mit pflanzlichen Mikroorganismen. — Basel: Verlag Birkhäuser (im Druck).
- Cooley, R. A., & G. M. Kohls (1944). The argasidae of North America, Central America and Cuba. — University Press, Notre Dame, Ind., 152 pp.
- Dutton, J. E., & J. L. Todd (1905). The nature of tick fever in the eastern part of the Congo Free State. — Brit. Med. J., vol. 2, p. 1259-1260.
- Dutton, J. E., & J. L. Todd (1907). A note on the morphology of *Spirochaeta duttoni*. — Lancet, vol. 2, p. 1523-1525.
- Fantham, H. B. (1911). Some researches on the life-cycle of *Spirochaetes*. — Ann. Trop. Med. & Parasitol., vol. 5, p. 479-496.
- Fantham, H. B. (1914). The granule phase of *Spirochaetes*. — Ann. Trop. Med. & Parasitol., vol. 8, p. 471-484.
- Fantham, H. B. (1916). *Spirochaetes* and their granular phase. — Brit. Med. J. p. 409-411.
- Feng, L. C., & H. L. Chung (1936). Studies on the Development of *Spirochaeta duttoni* in *Ornithodoros moubata*. — Chinese Med. J. vol. 50, p. 1185-1190.
- Feng, L. C., & H. L. Chung (1938). The effect of temperature on the development of *Spirochaeta duttoni* in *Ornithodoros moubata*. — Chinese Med. J. Suppl. No. 2, p. 555-562.

- Feng, L. C., & H. L. Chung (1939). The transmission of *Spirochaeta duttoni* by *Ornithodoros moubata*. — Acta Conventus Tertii Tropicis atque Malariae morbis, pars I, p. 438-443.
- Geigy, R., & W. Burgdorfer (1949). Versuche zur Uebertragung von *Spirochaeta duttoni* durch *Ornithodoros moubata*. — Rev. Suisse Zool., t. 56, No. 20, p. 334.
- Geigy, R., & W. Burgdorfer (1951). Unterschiedliches Verhalten verschiedener Stämme von *Spirochaeta duttoni* in der weißen Maus. — Acta Tropica, vol. 8, No. 2, p. 151—154.
- Hampp, E. G., D. B. Scott, & R. W. G. Wyckoff (1948). Morphologic Characteristics of certain cultured strains of oral spirochetes and *Treponema pallidum* as revealed by the electron microscope. — J. Bacteriol., vol. 56, p. 755-769.
- Hatt, P. (1929). Observations sur l'évolution des spirochètes des fièvres récurrentes chez les Ornithodores. — Arch. Inst. Pasteur Tunis, vol. 18, p. 258-264.
- Hindle, E. (1911 a). The transmission of *Spirochaeta duttoni*. — Parasitology, vol. 4, p. 133-149.
- Hindle, E. (1911 b). On the life-cycle of *Spirochaeta gallinarum*. — Parasitology, vol. 4, p. 463-477.
- Kleine, F. K., & B. Eckard (1913). Ueber die Lokalisation der Spirochaeten in der Rückfallfieberzecke (*O. moubata*). — Z. Hyg. u. Inf.krankh., vol. 74, p. 389-394.
- Kleine, F. K., & M. Krause (1932 a). Zur Kritik angeblicher Entwicklungsformen von Rückfallfieberspirochaeten in der Zecke (*Ornithodoros moubata*). — Arch. Schiffs- u. Trop. Hyg., vol. 36, p. 190-191.
- Kleine, F. K., & M. Krause (1932 b). Zur Uebertragung der Rückfallfieberspirochaete durch Zecken. — Arch. Schiffs- u. Trop. Hyg., vol. 36, p. 587-589.
- Koch, R. (1905). Vorläufige Mitteilungen über die Ergebnisse einer Forschungsreise nach Ostafrika. — Deutsche med. Wschr., vol. 47, p. 1866.
- Koch, R. (1906). Ueber afrikanischer Recurrens. — Berliner klin. Wschr., vol. 43, p. 185-194.
- Künßberg, K. von (1911). Eine Antikoagulindrüse bei Zecken. — Zool. Anzeiger, No. 38, p. 263-268.
- Lees, A. D. (1946). Chloride Regulation and the Function of the Coxal glands in Ticks. — Parasitology, vol. 37, p. 172-184.
- Lees, A. D., & J. W. L. Beament (1948). An egg-waxing organ in ticks. — Quart. J. Microscop. Sci., vol. 89, p. 291-333.
- Leishman, W. (1907). Spirochaetae of Relapsing Fever and Tick Fever. — Lancet, p. 806.
- Leishman, W. (1910). The mechanism of infection in tick fever and on the hereditary transmission of *Spirochaeta duttoni* in the tick. — Lancet, p. 11.
- Leishman, W. (1918). Note on "granuleclumps" found in *Ornithodoros moubata* and their relation to spirochaetes of African relapsing fever (tick fever). — Ann. Inst. Pasteur, vol. 32, p. 49-59.
- Leishman, W. (1920). *Spirochaeta duttoni*, the parasite of tick fever. — Lancet, p. 1237-1244.
- Lüscher, M. (1948). Gewebekultur «in vivo» bei *Rhodnius prolixus*. — Rev. Suisse Zool., t. 55, No. 7, p. 227-232.
- Nicoll, Ch., Ch. Anderson & J. Colas-Belcour (1930). Recherches expérimentales poursuivies à l'Institut Pasteur de Tunis, sur les conditions de la transmission des spirochètes récurrents par les Ornithodores. — Arch. Inst. Pasteur Tunis, t. 19, p. 133-227.

- Nicolle, Ch., & Ch. Anderson* (1930). Sur le mécanisme de la transmission des spirochètes récurrents par les Ornithodores. — 1^{er} Congrès Internat. Microbiol., Paris.
- Patton, W. S., & A. M. Evans* (1931). Insects, Ticks, Mites and Venomous Animals of Medical and Veterinary importance. — Croydon: H. R. Grubb, Ltd.
- Remy, P.* (1922). Sur le rejet de sang chez les Argasidae. — Arch. Zool. Exp. vol. 61, p. 1-16.
- Schuberg & Manteufel* (1910). Ueber erworbene Immunität gegen Recurrens bei Ornithodoros moubata. — Z. f. Immunit.forsch., vol. 4, p. 512-515.
- Todd, J. L.* (1913). A Note on the Transmission of Spirochaetosis. — Proc. Soc. Exp. Biol., vol. 10, p. 134.
- Wittrock, O.* (1913). Beitrag zur Biologie der Spirochaeta des Rückfallfiebers. — Z. f. Hyg., vol. 74, p. 55-60.
- Zuelzer, M.* (1920). Biologische Untersuchungen an Zecken. — Z. f. Immunit.forsch., vol. 30, p. 183-201

Summary.

After a detailed description of the anatomy of *Ornithodoros moubata*, the presence and behaviour of the agent of African relapsing fever, *Borrelia duttonii*, in the tick is discussed, as far as its transmission to warm-blooded animals. The results obtained are summarised in tables 20 A-D as follows:

1. If a tick sucks the blood of an infected man or animal (see fig. 20 A), the spirochaetes are carried with the absorbed blood via the pharynx (Ph) and oesophagus (Oe) into the middle intestine (MD), e.g., stomach, in the cavity of which they are found in continually decreasing numbers during 16 days. A few hours after the tick's feeding the agents already begin to gather on the periphery of the gut wall, attacking its epithelium cells and boring through the strata of the gut wall. At the earliest after 24 hours they penetrate the body cavity fluid (see fig. 20 B).

The development cycles (granulae) of *Borrelia duttonii* described by *Dutton & Todd*, *Leishman* and other authors cannot be seen either in the gut contents or in the gut wall. From the beginning of infection there are certainly, in the contents of the gut, a few and later more and more immobile, degenerated spirochaetes, but these are dead forms, incapable of developing and which have nothing to do with development stages.

2. In the haemolymph, shortly after the first arrival of the agents, a considerable multiplication of spirochaetes generally takes place. Their number and the time of occurrence varies, however, from tick to tick. This multiplication of the agents is due on one hand to division of the forms already in the body fluid; on the other hand to the continual liberation of fresh spirochaetes from the gut wall.

3. From the haemolymph the agents of relapsing fever infiltrate the various organs of the tick and their presence is proved at the earliest on the third day in the salivary glands (Sp), in the coxal organs (Co) and also in the central ganglion (Ce); in the Malpighian tubes on the fourth day (see fig. 20 C). The cavity of the last named organs and also the anal excretions of the tick remain constantly without spirochaetes. The central ganglions, the coxal organs and the Malpighian tubes in the nymph as well as in the adult tick are centres in which the spirochaetes multiply by simple and by multiple transverse division. *Borrelia duttonii* behave differently in the salivary glands: only the glands of nymphs show a strong permanent infection. The glands of the adult tick, how-