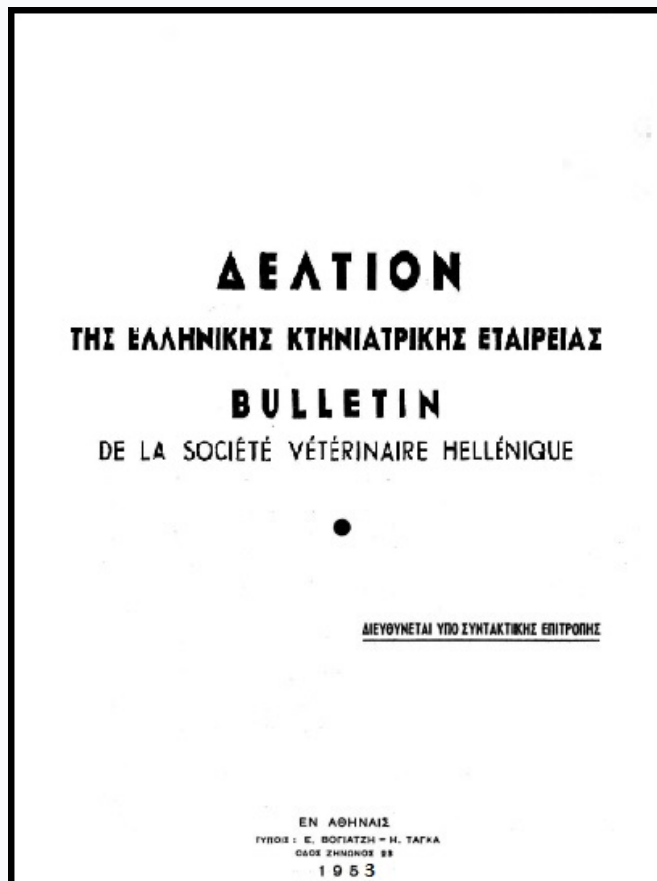


## Journal of the Hellenic Veterinary Medical Society

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### Η ΛΕΠΤΟΣΠΕΙΡΩΣΙΣ ΤΩΝ ΒΟΟΕΙΔΩΝ

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# ΔΕΛΤΙΟΝ

ΤΗΣ ΕΛΛΗΝΙΚΗΣ ΚΤΗΝΙΑΤΡΙΚΗΣ ΕΤΑΙΡΕΙΑΣ

## BULLETIN

DE LA SOCIÉTÉ VÉTÉRINAIRE HELLÉNIQUE

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ΤΕΥΧΟΣ 11<sup>ΟΝ</sup>

Τὸ κατωτέρω ἄρθρον ἐπὶ τῆς Λεπτοσπειρώσεως τῶν Βοοειδῶν ἐγγράφη εἰδικῶς διὰ τὸ Δελτίον τῆς Ἑλλ. Κτηνιατρικῆς Ἑταιρείας ἀπὸ τὸν διακεκριμένον ἐρευνητὴν κ. J. van der Hoeden Δ)τὴν τοῦ Κτηνιατρικοῦ Ἰνστιτούτου τοῦ Tel - Aviv (Ἰσραήλ), πρὸς τὸν ὁποῖον ἡ Ε.Κ.Ε. ἐκφράζει τὰς θερμοτάτας αὐτῆς εὐχαριστίας.

### Η ΛΕΠΤΟΣΠΕΙΡΩΣΙΣ ΤΩΝ ΒΟΟΕΙΔΩΝ

Ὑ π ὁ

J. VAN der HOEDEN

Διευθυντοῦ

τοῦ Κτηνιατρικοῦ Ἰνστιτούτου τοῦ Ὑπουργείου Γεωργίας

Tel - Aviv (Ἰσραήλ)

Κατὰ τὰ τελευταῖα ἔτη νέον κεφάλαιον προσετέθη εἰς τὴν Κτηνιατρικὴν Παθολογίαν ἀφ' ἧς ἀπεδείχθη ὅτι ἡ Λεπτοσπειρώσις παρατηρεῖται πολὺ συχνότερον μεταξὺ τῶν κατοικιδίων ζώων ἀφ' ὅ,τι ἐνομίζετο μέχρι τοῦδε.

Πράγματι ἀφ' ἧς ἐν ἔτει 1915 ἀπεδείχθη ὅτι ἡ Λεπτόσπειρα ἦτο τὸ παθογόνον αἷτιον τοῦ νόσου τοῦ Weil, παρῆλθον 10 καὶ πλέον ἔτη ἕως ὅτου αὕτη ἀνευρεθῇ καὶ εἰς ἄλλα ζῶα πλὴν τῶν τρωκτικῶν.

Μετὰ τὴν διαπίστωσιν λοιμώξεως ὀφειλομένης εἰς διάφορα εἶδη Λεπτοσπείρας εἰς τὸν κύνα, ἐξηκριβώθη ἡ ὑπαρξίς φυσικῆς λοιμώξεως εἰς τὴν γαλῆν, τὸν χοῖρον, τὸν ἵππον καὶ τὴν ἀργυρόχρουν ἀλώπεκα.

Ἡ Λεπτοσπειρώσις τῶν βοοειδῶν συναντᾶται διὰ πρώτην φορὰν εἰς τὴν Ρωσικὴν βιβλιογραφίαν. Κατέστη ὅμως ταχέως προφανές ὅτι συχνάκις ὁ ἀριθμὸς τῶν κλινικῶς ἐκδήλων περιστατικῶν τῆς νόσου δὲν δύναται νὰ θεωρηθῇ ὡς κριτήριον τοῦ βαθμοῦ μολύνσεως τῆς ἀγέλης. Ἐνῶ δὲ πολλαὶ ἀγελάδες παρουσιάζουσιν ὑψηλὸν τίτλον συγκολλήσεως καὶ λύσεως ἔναντι τῆς προκαλούσης τὴν νόσον Λεπτοσπείρας, ὁ ἀριθμὸς τῶν κλινικῶς νοσούντων ζώων εἶναι λίαν περιορισμένος. Ἐνίοτε μάλιστα παρατη-

ροῦνται θετικαὶ ὁροαντιδράσεις ἐπὶ ζώων ἐπὶ τῶν ὁποίων ἐν τούτοις οἱ τοπικοὶ κτηνίατροι οὐδέποτε διεπίστωσαν νοσηρὰς ἐκδηλώσεις Λεπτοσπειρώσεως.

Ἐξήγησις τῶν ἀφανῶν αὐτῶν λοιμώξεων δύναται νὰ εἶναι ἡ μείωσις τῆς φυσικῆς παθογονικῆς ἰσχύος τοῦ μικροοργανισμοῦ ἔναντι τοῦ ξενίζοντος αὐτὸν ζώου (π.χ. τῆς Λεπτοσπείρας τῆς Πομονείου ἔναντι τοῦ χοίρου) ἢ ὅτι ἡ ἐν λόγῳ ἐπιζωοτία χαρακτηρίζεται ἀπὸ τὴν ὑπαρξίν μεγάλου ἀριθμοῦ ὑποκλινικῶν (ἀφανῶν) λοιμώξεων.

Φαίνεται ἐν τούτοις ὅτι τὸ ἀποτέλεσμα τῆς ἐκ τῆς Λεπτοσπείρας λοιμώξεως ὁφείλεται μᾶλλον εἰς παράγοντας σχέσιν ἔχοντας πρὸς τὸν ζωϊκὸν ξενιστὴν καὶ οὐχὶ πρὸς τὸ εἶδος τοῦ παρασιτοῦντος μικροοργανισμοῦ. Ἐν τούτοις ἡ συχνότης ἐμφάνισεως ὠρισμένων συμπτωμάτων ὡς ὁ ἴκτερος καὶ ἡ αἰμοσφαιρινουρία ὑφίσταται πιθανώτατα τὴν ἐπίδρασιν αὐτῆς ταύτης τῆς Λεπτοσπείρας.

Ἐκτὸς τούτου ὅμως αἱ δίοδοι διὰ διαφόρων εἰδῶν ξενιστῶν δύνανται νὰ προκαλέσωσι τὴν αὐξομείωσιν τῆς παθογόνου ἰσχύος τοῦ μικροοργανισμοῦ μεταβάλλουσαι τὸν χαρακτῆρα τῆς ἐπιζωοτίας.

Ἡ νοσηρότης κατὰ τὰς ἐπιζωοτίας Λεπτοσπειρώσεως τῶν Βοοειδῶν ὑπελογίζετο εἰς τὰς Ἡνωμένας Πολιτείας κατὰ τὸ 1952 εἰς 70 %.

Ἐκ τῶν ἀνωτέρω περιστατικῶν 5 - 10 % παρουσίαζον βαρείαν μορφήν, 20 - 40 % ἡπίαν καὶ εἰς τὰ 20 - 30 % ἡ νόσος ἦτο ἀφανής. Οἱ ἀνωτέρω ἀριθμοὶ ἐν τούτοις δὲν ἔχουσιν ἐφαρμογὴν ἐπὶ πάσης ἐπιζωοτίας Λεπτοσπειρώσεως τῶν βοοειδῶν. Σημαντικαὶ διαφοραὶ παρατηροῦνται κατὰ τὰς διαφόρους ἐπιζωοτίας μιᾶς καὶ τῆς αὐτῆς περιοχῆς ἔστω καὶ ἐὰν αὗται ὁφείλονται εἰς τὸ αὐτὸ—ὁρολογικῶς—εἶδος Λεπτοσπείρας.

Παραθέτομεν κατωτέρω δύο παραδείγματα ἐκ τῆς προσωπικῆς ἡμῶν πείρας :

1. Τὸ ἔτος 1949 αἰφνιδίᾳ ἐπιζωοτία Λεπτοσπειρώσεως ἐνέσκηπεν ἐπὶ τῶν Βοοειδῶν μιᾶς Κοινότητος κειμένης εἰς τὴν παραλιακὴν πεδιάδα τοῦ Σαρὸν εἰς τὸ Ἰσραήλ. Ὁ ἀριθμὸς τῶν ζώων τῶν παρουσιαζόντων θετικὴν ὁροσυγκόλλησιν ἠῦξησε ταχέως : Δύο μῆνας μετὰ τὴν ἔναρξιν τῆς νόσου, ἐκ τῶν 95 ἐνηλίκων ἀγελάδων προερχομένων ἐκ διασταυρώσεως μετὰ τῆς γενεᾶς Frisian αἱ 88, καὶ ἐκ τῶν 22 μόσχων οἱ 14 παρουσίαζον θετικὴν ὁροσυγκόλλησιν. Δώδεκα ἀγελάδες ἐνόσησαν σοβαρῶς ἐκ τῶν ὁποίων αἱ δέκα ἔθανον ἢ ἐσφάγησαν ἐν ἀγωνίᾳ. Τριάκοντα περίπου ἄλλαι ἀγελάδες παρουσίασαν ἐλαφρὰ συμπτώματα τῆς νόσου (μείωσιν τῆς ὀρέξεως καὶ τῆς γαλακτοπαραγωγῆς ἐπὶ τινὰς ἡμέρας), ἐνῶ αἱ λοιπαὶ ἦσαν κλινικῶς ὑγιεῖς. Ἡ ἀνωτέρω κλινικὴ εἰκὼν προσομοιάζει, ὡς προείπομεν, πρὸς τὴν ἐν ταῖς Ἡνωμέναις Πολιτείαις παρατηρουμένην τοιαύτην.

2. Σημαντικὴ παραλλαγή ἐκ τῆς ἀνωτέρω εἰκόνης παρατηρήθη τὸ

1951 κατὰ μίαν ἐπιζωοτίαν Λεπτοσπειρώσεως προσβαλλοῦσαν ἐντοπίας ἀραβικᾶς αἵγας ἐκτρεφομένας κατὰ μῆκος τῶν πρὸς τὴν Ἰορδανίαν συνόρων. Ἡ ἐπιζωοτία αὕτη ὤφειλετο, ὥς ἀπεδείχθη ἐκ τῆς ὁρολογικῆς ἐξετάσεως, εἰς τὸ αὐτὸ εἶδος Λεπτοσπείρας ὡς τὸ ἀπομονωθὲν κατὰ τὴν ἐπιζωοτίαν τῆς περιοχῆς τοῦ Σαρόν. Ἡ ὁροσυγκόλλησις τοῦ αἵματος 54,8 % τῶν αἰγῶν ὡς ἐπίσης 53,4 % τῶν ἀγελάδων ὑπῆρξεν θετική. Ἐνῶ ὅμως ὅλαι αἱ θετικῶς ἀντιδράσασαι αἶγες ἐνόσησαν βαρέως καὶ 106 ἐκ τοῦ ἀριθμοῦντος 240 ἄτομα ποιμνίου ἔθανον, ὅλαι αἱ θετικῶς ἀντιδράσασαι ἀραβικῆς γενεᾶς ἀγελάδες παρέμειναν κλινικῶς ὑγιεῖς.

Ἐκτὸς τῶν μεγάλων τούτων διαφορῶν εἰς τὴν κλινικὴν ἐμφάνισιν τῆς νόσου, δύναται τις κατὰ τὰς διαφόρους ἐπιζωοτίας Λεπτοσπειρώσεως νὰ συναντήσῃ ποικίλλας κλινικῶς ἐνδιαμέσους μορφάς.

Τὰ συμπτώματα τῆς Λεπτοσπειρώσεως τῶν βοοειδῶν δὲν εἶναι σαφῶς διαγεγραμμένα. Πρόκειται μᾶλλον περὶ συνδρομῆς συντεθειμένης ἐκ τοῦ συνδυασμοῦ τῶν διαφόρων συμπτωμάτων.

Ἐξ ἄλλου δὲν πρέπει νὰ παρορᾶται ὅτι καὶ μὴ εἰδικῆς φύσεως νοσήραι ἐκδηλώσεις ὡς π. χ. ἡ ἀνορεξία, ἡ μείωσις τῆς γαλακτοπαραγωγῆς καὶ ἐνδεχομένως ἡ ἔκτρωσις δύνανται νὰ εἶναι αἱ μοναδικαὶ ἀντιδράσεις τοῦ ὁργανισμοῦ αἱ ὀφειλόμεναι εἰς τὴν ἐκ Λεπτοσπειρῶν μόλυνσιν καὶ κατὰ συνέπειαν ἐν ἀπουσίᾳ γνωστοῦ αἰτιολογικοῦ παράγοντος δέον ὅπως ἀντιμετωπίζεται ἡ πιθανότης ὑπάρξεως Λεπτοσπειρώσεως.

Ἡ τυπικὴ συνδρομὴ περιλαμβάνει συνήθως τὰ ἑξῆς συμπτώματα: Ἀνορεξίαν συνοδευομένην ἀπὸ πυρετὸν κατὰ τὰς πρῶτας ἡμέρας τῆς νόσου, παροδικὴν κατὰπτωσιν καὶ κατῆφειαν, μείωσιν τῆς γαλακτοπαραγωγῆς χαρακτηριζομένην ἀπὸ ἔκκρισιν γάλακτος ὑποκιτρίνου ἢ αἱματηροῦ καὶ ἔχοντος ὑφὴν πυκνοτέραν τοῦ συνήθους. Ἐνῶ δὲ δὲν ὑφίσταται μαστίτις ὁ μαζικός ἀδὴν δύναται νὰ παρουσιάσῃ σκλήρυνσιν ἢ χαλάρωσιν.

Ἐκτὸς τῶν ἀνωτέρω συμπτωμάτων παρατηροῦνται ἐπιπροσθέτως ἱκτερος καὶ οὖρα χρώματος ἐρυθροῦ μέχρι ὑπομέλανος μετὰ καταστροφῆς τῶν ἐρυθρῶν αἰμοσφαιρίων (\*Λοιμώδης αἱμολυτική ἀναιμία καὶ αἱμοσφαιρινουρία).

Κατὰ τὴν ἐμπύρετον περίοδον ἐπέρχεται λευκοπενία χαρακτηριζομένη ἀπὸ τὴν ταυτόχρονον ἐλάττωσιν τῶν τε οὐδετεροφίλων καὶ τῶν λεμφοκυττάρων. Ἡ ἔκτρωσις παρατηρεῖται ἀνεξαργτήτως τοῦ σταδίου τῆς ἐγκυμοσύνης συνήθως δὲ 2-3 ἑβδομάδας μετὰ τὴν εἰσβολὴν τῆς νόσου. Ἡ οὖραιμικὴ συνδρομὴ ἡ ὁποία παρατηρήθη εἰς τὸ Ἰσραὴλ εἰς τὰ σοβαρὰ περιστατικά δὲν ἀναφέρεται ὑπὸ τῶν βορειοαμερικανῶν μελετητῶν τῆς νόσου. Ἡ γενικὴ καταβολὴ τῶν δυνάμεων δύναται νὰ εἶναι πρῶτος καὶ νὰ ἀγάγῃ τὸ ζῶον εἰς πλήρη ἀπίσχανσιν.

Εἰς πλείστας περιπτώσεις, μετὰ περίοδον βελτιώσεως ἐπέρχεται ὑποτροπὴ ἡ ὁποία συνήθως ἄγει εἰς τὸ μοιραῖον.

Ἡ θνητότης κατὰ τὰς διαφόρους ἐπιζωοτίας ποικίλλει ἀπὸ μηδὲν μέχρι 10 % καὶ πλέον, τῶν νοσούντων ζώων.

Αἱ σπουδαιότεραι καὶ σταθερώτεραι ἱστολογικαὶ ἀλλοιώσεις παρατηροῦνται εἰς τοὺς νεφροὺς: Θολερὰ ἐξοίδησις ἢ καὶ νέκρωσις τῶν ἐπιθηλιακῶν κυττάρων τῶν ἐσπειραμένων σωληναρίων, λεμφοκυτταρικαὶ διηθήσεις καὶ αἱμορραγίαι τοῦ διαμέσου συνδετικοῦ ἱστοῦ.

Τὰ νεφρικά σωματίδια γενικῶς δὲν παρουσιάζουσιν ἀλλοιώσεις. Αἱ Λεπτόσπειραι, ἐὰν ὑπάρχουσι, παρατηροῦνται ἐντὸς τοῦ αὐλοῦ τῶν νεφρικών σωληναρίων. Εἰς τὸ ἥπαρ, πλὴν τῆς διηθήσεως τοῦ περὶ τὴν πυλαίαν φλέβα παρεγχύματος διὰ στρογγύλων κυττάρων, παρατηρεῖται ἐπίσης λιπώδης ἐκφύλισις, ρήξις καὶ νέκρωσις τῶν ἡπατικῶν κυττάρων.

Ἡ παρουσία Λεπτοσπειρῶν ἐν τῷ ἥπατι καὶ τοῖς νεφροῖς δὲν εἶναι συνάρτησις τῆς κυτταρικῆς διηθήσεως. Εἶναι μάλιστα ἀξιοσημείωτον ὅτι οὐδεμία σχέσις ὑπάρχει μεταξὺ τῆς σοβαρότητος τῶν κλινικῶν ἐκδηλώσεων καὶ τῆς βαρύτητος τῶν ἀνατομοπαθολογικῶν βλαβῶν.

Ὅσον ἀφορᾷ εἰς τὸν διαχωρισμὸν τῶν διαφόρων εἰδῶν Λεπτοσπειρῶν εἰς τοὺς ἀποκληθέντας ὀρολογικοὺς τύπους, αἱ μόναι ἄξιοι ἐμπιστοσύνης μέθοδοι αἱ δίδουσι ἐπαρκῶς σταθερὰ ἀποτελέσματα εἶναι: ἡ μέθοδος τῆς διασταυρουμένης ὁροσυγκολλήσεως καὶ λύσεως καὶ ἡ μέθοδος τῆς ἀπορροφήσεως τῶν συγκολλητινῶν.

Λεπτόσπειραι ἀνήκουσαι εἰς διαφόρους ὀρολογικοὺς τύπους ἔχουσι τὴν ἱκανότητα νὰ εισδύωσι ἐντὸς τῶν ἱστῶν τῶν βοοειδῶν καὶ νὰ προκαλῶσι τὴν γένεσιν ἀντισωμάτων καὶ τὴν δημιουργίαν ἀνατομοπαθολογικῶν ἀλλοιώσεων.

Τὸ πρῶτον εἶδος Λεπτοσπείρας ὅπερ ἀπεμονώθη ἐκ τῶν βοοειδῶν κατὰ μίαν ἐπιζωοτίαν εἰς τὴν Νότιον Ρωσσίαν (1935) ἐκλήθη ἀρχικῶς «Λεπτόσπειρα τῆς ἱκτεροαιμοσφαιρινουρίας τοῦ βοῦς» βραδύτερον ὁμῶς ἀπεδείχθη ὅτι αὕτη ἦτο ταυτόσημος πρὸς τὴν «Λεπτόσπειραν τὴν Γριπποτυφώδη» τὴν προκαλοῦσαν τὴν «Νόσον τῆς Ἰλῦς» εἰς τὸν ἄνθρωπον. Ὅμοια εἶδη Λεπτοσπειρῶν ἀπεμονώθησαν εἰς τὸ Ἰσραήλ ἐκ βοοειδῶν, ὡς καὶ ἐξ ἀνθρώπων οἱ ὁποῖοι ἤρχοντο εἰς ἐπαφὴν μὲ τὰ ζῶα ταῦτα.

Τὰ εἶδη ταῦτα ἐπωνομάσθησαν «Λεπτόσπειρα ἡ Βόειος» ἐπειδὴ ὁμῶς δὲν διαφέρουσιν ἀντιγονικῶς ἀπὸ τὸ εἶδος «Λεπτόσπειρα ἡ Γριπποτυφώδης» τὸ ὄνομα «Λ. ἡ Βόειος» δέον ὅπως ἐγκαταλειφθῇ.

Ἀφ' ἐτέρου ἐν Ἑλβετίᾳ κατὰ τὸ 1947 καὶ ἐκ τοῦ αἵματος δύο ἀγελάδων πασχουσῶν ἐκ Γαγγραινώδους Κορύζης ἀπεμονώθη ὁ αὐτὸς ὀρολογικὸς τύπος Λεπτοσπείρας. Ἐπίσης σποραδικαὶ λοιμῶξεις ὀφειλόμεναι εἰς «Λ. τὴν ἱκτεροαιμορραγικὴν» διεπιστώθησαν ἐπὶ μόσχων ἐν Ἀγγλίᾳ τὸ 1950. Τὸ 1942 ἡ «L. Hyos» (Mitis Johnson) ἀπεμονώθη ἐκ σταβλιτῶν οἱ ὁποῖοι ἐνοσήμερον βοοειδῇ πάσχοντα ἐξ αἱμοσφαιρινουρίας καὶ οἱ

ὅποιοι παρουσίαζον ὑψηλὸν τίτλον συγκολλήσεως τοῦ ὁρολογικοῦ τούτου τύπου. Τὸ 1949 βαρεῖα νόσος τῶν μόσχων μελετηθεῖσα εἰς Κουηνσλάνδην ὠφείλετο εἰς «Λ. τὴν Πομόνειον». Μεταγενέστεραι ἐπιζωοτίαι ἐσημειώθησαν εἰς Βικτωρίαν, Αὐστρικὴν Αὐστραλίαν καὶ Νέαν Ζηλανδίαν. Σημαντικὸς ἐπίσης ἀριθμὸς ἐπιζωοτιῶν ὀφειλομένων εἰς τὴν «Λ. τὴν Πομόνειον» παρατηρήθη εἰς τὰς Ἡνωμ. Πολιτείας τῆς Β. Ἀμερικῆς (1946) καὶ τὴν Ἀργεντινὴν.

Ἐπ' ἐσχάτων διεπιστώθησαν εἰς τρεῖς περιοχὰς τοῦ Ἰσραὴλ λοιμῶξεις τῶν βοοειδῶν ὀφειλόμεναι εἰς τὴν «Λ. τὴν Κυνοκτόνον». Τὰ περιστατικὰ ταῦτα, μὴ δημοσιευθέντα εἰσέτι, εἶναι τὰ πρῶτα τὰ ἀναφερόμενα εἰς προσβολὴν ἄλλων ζώων — πλὴν τῶν κυνῶν — ὑπὸ τῆς ἀνωτέρω Λεπτοσπείρας.

Ἐκτὸς τῶν ἀνωτέρω χωρῶν εἰς τὰς ὁποίας ἡ αἰτιολογικὴ ἀπόδοσις τῶν Λεπτοσπειρώσεων καθωρίσθη διὰ τῆς ἀπομονώσεως Λεπτοσπειρῶν ἐκ τῶν νοσούντων ζώων, διεπιστώθη ἐπίσης εἰς διαφόρους ἄλλας χώρας ἡ ὑπαρξὶς κρυψιλοιμώξεων διὰ τῆς ἐξακριβώσεως ὑψηλῶν τίτλων ὁρσουγκολλήσεως εἰς αἷμα φαινομενικῶς ὑγιῶν ἀγελάδων.

Ἐν Δανίᾳ π. χ. ὑγιᾶ βοοειδῇ παρουσίασαν συγκολλητίνας ἐναντίον τῆς «L. Sejroë» καὶ τῆς «L. Saxkoebing». Ἐν Γερμανίᾳ ἐναντίον τῆς «Λ. τῆς ἱκτεροαιμορραγικῆς», «Λ. τῆς Γριπποτυφώδους», «L. Sejroë», «L. Hyos» καὶ «L. Australis». Ἐν Ἑλβετίᾳ ἐναντίον τῆς «L. Sejroë», «Λ. τῆς Πομονείου», «L. Hyos» καὶ τῆς «Λ. τῆς ἱκτεροαιμορραγικῆς». Ἐν Ἰταλίᾳ ἐναντίον τῆς «Λ. τῆς Πομονείου» καὶ τῆς «Λ. τῆς ἱκτεροαιμορραγικῆς». Ἐν Ἰαπωνίᾳ ἐναντίον τῆς «L. Australis», «L. Autumnalis» καὶ τῆς «L. Hebdomadis». Μικρὸς ἀριθμὸς θετικῶν ἀντιδράσεων διεπιστώθη ἐπίσης ἐν Ὀλλανδίᾳ ἐναντίον τῆς «Λ. τῆς ἱκτεροαιμορραγικῆς» καὶ τῆς «Λ. τῆς Γριπποτυφώδους». Ἀναφέρομεν ἐπίσης ὅτι ὑψηλὸν ποσοστὸν βοοειδῶν εἰσαχθέντων πρὸς σφαγὴν εἰς τὸ Κράτος τοῦ Ἰσραὴλ ἐκ τῶν ὁμόρων ἀραβικῶν χωρῶν καὶ τῆς Τουρκίας παρουσίασαν θετικὴν ἀντίδρασιν ὡς πρὸς τὴν «Λ. τὴν Γριπποτυφώδη».

Ἐκ τῶν ἀνωτέρω συνάγεται ὅτι τὰ εἶδη τῶν Λεπτοσπειρῶν εἶναι εὐρέως διαδεδομένα εἰς τὰ βοοειδῇ τῶν διαφόρων χωρῶν.

Ἐξ ἄλλου βαρεῖαι ἐπιζωοτίαι Λεπτοσπειρώσεως παρατηρήθησαν εἰς Ρωσίαν, Β. Ἀμερικὴν, Αὐστραλίαν, Νέαν Ζηλανδίαν καὶ Ἰσραὴλ.

Λόγω τῆς ἀσταθείας τῶν εἰς Λεπτοσπείρας ὀφειλομένων λοιμώξεων τῶν βοοειδῶν, ἡ παρουσία φαινομενικῶς ὑγιῶν ἀλλὰ θετικῶς ἀντιδρώντων ζώων εἰς περιοχὰς εἰς τὰς ὁποίας ἡ Λεπτοσπείρωσις δὲν ἔχει εἰσέτι διαγνωσθεῖ ἐπὶ βοοειδῶν, δέον ὅπως θεωρεῖται ὡς λανθάνων κίνδυνος, καθ' ὅσον αὕτη δύναται ν' ἀποτελέσῃ τὴν ἀφετηρίαν σοβαρῶν ἐπιζωοτιῶν.

Συνήθως ὁ ὁρολογικὸς τύπος ὑποδεικνύει τὴν ἐπιζωοτολογικὴν σχέ-

σιν μὲ καλῶς καθωρισμένον φορέα ἐξ οὗ προέρχεται ἡ μόλυνσις τῶν βοοειδῶν.

Εἰς τὰς χώρας ἐκείνας εἰς τὰς ὁποίας ἡ Λεπτοσπειρώσις ὀφείλεται εἰς τὴν «Λ. τὴν Πομόνειον» ἢ τὴν «L. Hyos» οἱ χοῖροι εἶναι πιθανώτατα οἱ φορεῖς τῆς νόσου. Μετὰ τὴν μετάδοσιν τῆς νόσου ἐκ τοῦ φυσικοῦ φορέως εἰς τὰ βοοειδῆ ἡ περαιτέρω μετάδοσις εἰς τὰς ἀγελάδας δύναται νὰ λάβῃ χώραν διὰ τῶν οὐρῶν τῶν φερόντων Λεπτοσπείρας εἰς τοὺς νεφροὺς τῶν ζώων εἴτε ταῦτα εἶναι ἀσθενῆ, ἀναρρωνύοντα ἢ καὶ φαινομενικῶς μὲν ὑγιᾶ ἀλλ' ἀπεκκρίνοντα Λεπτοσπείρας.

Εἰς τὸ Κράτος τοῦ Ἰσραὴλ εἶδος τι ἀρουραίου ὁ *Microtus guentheri* θεωρεῖται ὡς κοινὸς φορεὺς τῆς «Λ. τῆς Γριμποτυφώδους» τόσον διὰ τὸν ἀνθρωπον ὅσον καὶ διὰ τὰ βοοειδῆ, ἐνῶ ἄλλα ἄγρια τρωκτικὰ θεωροῦνται ὀλιγώτερον ὑπεύθυνα διὰ τὴν μετάδοσιν αὐτῆς.

Ἀντιθέτως πρὸς τὸν ἀνωτέρω ἀρουραῖον ὅστις ἐπιζεῖ τῆς λοιμώξεως καὶ ἀποβαίνει φορεὺς, ἄλλα ἄγρια τρωκτικὰ (*Gerbils*) θνήσκουν ἐξ ὀξείας Λεπτοσπειρώσεως εὐθὺς ὡς νοσήσουν ἐκ ταύτης.

Θεωρεῖται ἐν Ἰσραὴλ ὅτι ἡ Λεπτόσπειρα ἡ Κυνοκτόνος μεταδίδεται εἰς τὰ βοοειδῆ πιθανῶς ὑπὸ τῶν θωῶν.

Τὰ σοβαρώτερα μέτρα καταπολεμήσεως τῆς Λεπτοσπειρώσεως τῶν βοοειδῶν ἔχουσιν ὡς ἀντικειμενικὸν σκοπὸν τὴν καταστροφὴν τῶν ζώων ἐκείνων τὰ ὁποῖα ἀπεκκρίνουν Λεπτοσπείρας διὰ τῶν οὐρῶν των. Κατὰ συνέπειαν ἐπιβάλλεται ἡ ἐξόντωσις τῶν ἀγρίων τρωκτικῶν καὶ τῶν θωῶν ὁσάκις ὁ καθορισμὸς τοῦ ὁρολογικοῦ τύπου τῆς Λεπτοσπείρας ὑποδεικνύει τὰ ζῶα ταῦτα ὡς πιθανὴν πηγὴν τῆς μόλυνσεως. Ὅμοίως τὰ νοσοῦντα ζῶα πρέπει νὰ ἀπομονοῦνται καὶ νὰ μὴ ἔρχονται εἰς οὐδεμίαν ἐπαφὴν μὲ τὰ ὑγιᾶ τοιαῦτα ἐπὶ πολλοὺς μῆνας μετὰ τὴν ἀνάρρωσίν των.

Εἰς τὴν Σοβιετικὴν Ρωσίαν καὶ τὰς Ἑνωμένας Πολιτείας ἐφαρμόζεται προληπτικὸς ἐμβολιασμὸς κατὰ τῆς νόσου ταύτης.

Ὅσον ἀφορᾷ εἰς τὴν θεραπείαν δὲν ὑπάρχουσι μέχρι σήμερον ἐπαρκῆ δεδομένα ἐπιτρέποντα τὴν ἐξαγωγὴν βασίμων συμπερασμάτων ἐπὶ τῆς σκοπιμότητος τῆς χρήσεως βιοθεραπευτικῶν. Ἐν τοσούτῳ ἡ Στρεπτομυκίνη, ἡ Χρυσομυκίνη καὶ ἡ Γαιωμυκίνη φαίνονται ὅτι ἔχουν εὐνοϊκὴν ἐπίδρασιν ἐπὶ τῆς νόσου κατὰ τὸ δὲ στάδιον αὐτῆς, βραχύνοντα τὴν διαδρομὴν τῆς καὶ ἐπιταχύνοντα τὴν ἐπάνοδον εἰς τὴν φυσιολογικὴν γαλακτοπαραγωγὴν.

K.B.T.

## BOVINE LEPTOSPIROSIS

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In recent years a new chapter has been added to Veterinary pathology ever since leptospirosis was proven to occur much more frequently among domestic animals than had been known hitherto.

Leptospira was found to be the causative agent of Weil's disease, in 1915. It took more than ten years before they were revealed in other animals than rodents. After infections by different types of leptospira were observed in dogs, also cats, pigs, horses and silver-foxes were found to be naturally infected.

Leptospirosis in cattle was for the first time described in Russian literature. Soon it became evident that frequently the number of cases of clinical sickness cannot serve as a criterion for the extent of infection in the herd. Several cows show significant agglutinin-lysis titres against the causative leptospiratype, whereas the number of cases of actual disease is much more limited. It even often happens that positive serumreactions are encountered in animals while no clinical cases of leptospirosis had ever been recognised by the local veterinarian.

The explanation for these hidden infections may be a low natural pathogenicity of the microbe for the host-animal (e.g. *L. pomona* in pigs), or that the prevailing enzootic is characterised by a large number of subclinical infections.

It seems that the effect of leptospira-infection in cattle depends more on conditions connected with the host-animal than on the type of the parasitic organism. Nevertheless, the frequency in which particular symptoms, such as jaundice and red-water, appear, may be influenced by the leptospira-type itself. Besides this, different degrees of virulence, probably due to passage through certain host-species, may add to the character of an outbreak.

The average morbidity-rate of enzootic bovine leptospirosis in the U.S.A. (1951) was supposed to be about 70 percent. In 5 to 10 percent of the cases the illness took a severe course; 20 to 40 percent developed a mild form and in 20 to 30 percent the disease was inap-



parent. These figures, however, don't apply to every outbreak of leptospirosis in cattle. Considerable differences characterize various enzootics even in the same region and caused by one and the same serotype of leptospira.

Here follow two examples from our own experience.

1) In 1949 a sudden outbreak of leptospirosis occurred among the cattle of a communal settlement in the coastal plain of Sharon in Israel. The number of animals showing specific bloodagglutinins increased rapidly. Two months after onset of the disease 88 out of 95 adult Frisian-cross-bred milking cows, and 14 out of 22 calves reacted with leptospira. Twelve cows were seriously sick, and ten of these died or were slaughtered in extremis. Approximately 30 other cows showed slight symptoms of the disease (lack of appetite during a few days, decreased milk yield). The rest of the cows remained clinically healthy.

This picture is in close agreement with the American figures, mentioned above.

2) A marked deviation from the above ratio was noticed in an outbreak of leptospirosis among local arab goats, in 1951, occurring along the border of Jordan State, and caused by the same leptospiratype as was isolated from cattle in the forementioned enzootic in the Sharon district. In the bloodsera of 54,8 percent of the goats as well as in those of 53,4 percent of the cows positive agglutination reactions developed. However, whereas nearly all reacting goats suffered very badly from the disease, and 106 of a flock of 240 succumbed, all reacting arab cows remained clinically healthy.

Besides such extreme differences in clinical appearance one may encounter enzootics of bovine leptospirosis showing various intermediate pathological pictures.

The symptoms of leptospirosis in cattle are not clearcut. None of them are pathognomonic in themselves. Combination of symptoms, however, may constitute a suggestive syndrome.

On the other hand it must be kept in mind that unspecific deviations from the normal, such as lack of appetite, temporary alterations in milkproduction, and occasional abortions, may be the only bodyreaction to the infection, and therefore, in the absence of known etiological factors, the probability of leptospirosis should be considered in such cases.

The complete syndrome may involve the following symptoms: Anorexia and rise of temperature during the first days of illness.

Transient state of depression and dullness. Decreased production of milk of a thickened, bloody or yellowish appearance. Though no real mastitis exists, the udder may be flabby or slightly hardened. In addition to the above there may appear: jaundice, red to nearly black urine, blood destruction («infectious hemolytic anemia and hemoglobinuria»), and, during the febrile period, leucopenia of both neutrophils and lymphocytes. Abortion may occur independent of the stage of pregnancy, usually in the second or third week after infection. A uremic syndrome is common in severe cases in Israel, but has not been reported in North America. General weakness may develop early, and that up to a state of utmost emaciation.

In several cases, after a period of temporary improvement, relapses occur which usually take a fatal course. The mortality of different enzootics is extremely divergent, and varies from zero to ten or more percent of the affected animals.

The most important and constant histological changes are present in the kidneys: swelling, degeneration and necrosis of the epithelial cells of the tubuli contorti, interstitial lymphocytic infiltrations and hemorrhages. The glomeruli are generally unaffected. *Leptospira*, if present, are found in the lumina of the renal tubules. In the liver round-cell infiltrations of the periportal tissue, fatty degeneration, dissociation and necrosis of hepatic cells are found.

The presence of *leptospira* in liver and kidneys does not correlate with cellular infiltrations. It is noteworthy that often no relationship exists between the intensity of histologic changes and the seriousness of clinical manifestations.

The only reliable techniques known, which give sufficiently constant results in the differentiation of *leptospira* strains into so-called serotypes, are the cross agglutination-lysis test and the agglutinin absorption test. *Leptospira* of various serotypes possess the power to penetrate into the tissues of cattle and give rise to antibody-production and pathologic changes.

The first *leptospira* strain isolated from cattle during an outbreak in Southern Russia (1935), was originally called *L. icterohemoglobinuriae bovis* or *vitulorum*. Later it proved to be identical with the mudfever strain of man, *L. grippotyphosa*.

Similar strains were isolated in Israel (1945) from cattle and persons who had been in close contact with these animals. They are known by the name *L. bovis*. However, since they do not differ

antigenically from the grippotyphosa type, the name *L. bovis* should be abandoned.

From the blood of two cows suffering from gangrenous coryza in Switzerland the same serotype was isolated (1947). Occasional *L. icterohaemorrhagiae* infections in calves were observed in England (1950).

In 1942 *L. hyos* (syn. *mitis* Johnson) was isolated from stablemen who attended cattle suffering from «redwater» and showed high agglutination titres against this serotype.

A severe disease of calves in Queensland (1949) was caused by *L. pomona*. Consecutive outbreaks occurred in Victoria, West-Australia and New-Zealand.

Several enzootics of *pomona*-infections have been observed in cattle in the U.S.A. (1946) and the Argentina (1949).

Infections of cattle by *L. canicola*, as yet unpublished, have recently been observed in three settlements in Israel. These are the first natural *canicola*-infections detected in animals other than canines.

In addition to the above mentioned countries, where the etiological importance of leptospira has been established by their isolation from sick cattle, the presence of occult infections has been demonstrated in several other territories by the detection of significant agglutination titres in the blood of apparently healthy cows.

Cattle, not suspected of disease, in Denmark showed agglutinins against *L. sejroe* and *L. saxkoebing*, in Germany against *L. icterohaemorrhagiae*, *L. grippotyphosa*, *L. sejroe*, *L. hyos* and *L. australis* in Switzerland against *L. sejroe*, *L. pomona*, *L. hyos* and *L. icterohaemorrhagiae*, in Italy against *L. pomona* and *L. icterohaemorrhagiae*, in Japan against *L. australis* A, *L. autumnalis* and *L. hebdomadis*. A very small number of positive reactions were found in cattle in the Netherlands against *L. icterohaemorrhagiae* and *L. grippotyphosa*. A rather high proportion of cattle imported for slaughter into Israel, from the neighbouring Arab countries and Turkey reacted to *L. grippotyphosa*.

From the foregoing facts it may be concluded that different leptospiratypes are widely distributed in bovines in various parts of the world.

Severe outbreaks of disease were observed in Russia, Northern America, Australia, New-Zealand and Israel.

In view of the precarious character of leptospira-infections in cattle, the presence of apparently healthy animals reacting to leptospira, in areas where leptospirosis is yet an unknown cattle-disease, must be considered as a latent danger, since they may become the starting point of serious outbreaks.

Usually the serotype indicates the epizootological relationship with a well defined natural reservoir, from which the infection of cattle has derived.

In countries where bovine leptospirosis is brought about by *L. pomona* or *L. hyos*, pigs are suspected of being the source of infection. After the infection has been transmitted from the natural reservoir to cattle, further spread among the cows may take place by means of the urine of renal leptospira-carriers which may exist among the sick, convalescent, recovered or apparently healthy animals.

In Israel the vole (*Microtus guentheri*) is considered to be the common source of *L. grippotyphosa*-infection of man as well as of cattle. Other field-rodents are much less suspected in this connection. Unlike *Microtus* which survives infection and becomes a carrier, other wild rodents (gerbils) as a rule die from acute leptospirosis soon after contracting the disease. In Israel infections of cattle by *L. canicola* presumably originate from jackals.

The most important measures of control of bovine leptospirosis aim at the elimination of animals which shed leptospira in their urine.

Eradication of wild rodents and jackals should be attempted wherever the leptospiratype points at these animals as a possible natural source of infection.

Infected cattle should be kept separated from the healthy stock during several months after recovery.

In the U.S.S.R. and the U.S.A. preventive vaccination has been put into practice.

Up to now, there has not accumulated sufficient experience to permit us any definite conclusions with regard to the practicality of treating sick animals with antibiotics, however, streptomycin, aureomycin and terramycin seem to have some beneficial effect in the acute stage of the disease, shortening its duration and speeding up return to normal milkproduction.

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## ΠΡΟΛΗΠΤΙΚΟΣ ΑΝΤΙΛΥΣΣΙΚΟΣ ΕΜΒΟΛΙΑΣΜΟΣ ΤΩΝ ΚΥΝΩΝ ΕΝ ΕΛΛΑΔΙ ΔΙ' ΕΜΒΟΛΙΟΥ ΠΑΡΑΧΘΕΝΤΟΣ ΕΠΙ ΕΜΒΡΥΟΦΟΡΩΝ ΩΩΝ ΟΡΝΙΘΟΣ (ΑΝΙΑΝΙΣÉ)\*

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Χάρis εἰς τὰ αὐστηρὰ ὑγειονομικὰ μέτρα τὰ ληφθέντα πρὸ τοῦ τελευταίου Παγκοσμίου πολέμου, τὰ κρούσματα λύσσης εἶχον ἐλαττωθεῖ εἰς τοιοῦτον βαθμὸν ὥστε ἠλπίζετο ὅτι ἡ νόσος θὰ ἐξέλιπεν ἐντὸς τῶν ὀλίγων προσεχῶν ἔτων.

\* Ἐκθεσις ὑποβληθεῖσα εἰς τὴν ἐπὶ τῆς λύσσης Ἐπιτροπὴν τῆς Παγκοσμίου Ὁργανώσεως Ὑγείας (W.H.O.).