Oedematous Skin Disease (OSD) Transmission among Buffaloes

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Abstract

During buffaloe OSD spread in a village affiliating to Assiut Governorate-Egypt, 44 buffaloe cows hosted and owned sporadically were subjected to the study. From 43 buffaloe cows (had closed lesions either edematous or nodular) and a buffaloe cow (had open ulcerative lesion), Corynebacterium pseudotuberculosis equi (C. ps. equi) as 72

Index terms— buffaloes, oedematous skin disease, corynebacterium pseudotuberculosis, hippobosca equina.

1 B insects hosted on the infected buffaloe cows (no. 22) louse

The insects were collected directly using sterile forceps from infected buffalo or donkeys hosted together. They were kept into plastic sacs or wide-naked bottles for laboratory examination where they taxonomically identified (Soulsby, 1982 and **??**ettle, 1984). 22 H. equina flies as well as 20 H. eurysternus lice were used for bacteriological examination and the rest were used in parasitological investigation.

2 b) Lab reared H. equina flies

18 flies were still alive for 24 hours where some of them deposited their larvae (Full mature larvae) inside the collected sacs untill larvae pupated. The achieved pupae were incubated at room temperature in plastic sand containers covered with a piece of gauze until giving adult fly (Baraka, 1983). These different stages were photomicrograph.

3 c) Bacteriological examination

Bacteriological examination was conducted with 22 flies gathered in sterile plastic sacs from infested animals (17 affected buffaloes, 4 cattle and a donkey hosted together). In addition to two pupae (lab deposited) and one laboratory developed fly (second generation) as well as 20 H. eur. lice for bacterial existence as follows:

1. Fly was inoculated as it is into a sterile nutrient broth tube for bacterial isolation from body surface, legs and external mouth parts contamination (EBS). 5. To obtain their external (EBS) and internal (IBC) bacterial contents. 6. From the laboratory deposited pupae, 2 were burst into nutrient broth to isolate their bacterial contents.

4 d) Bacteriological examination

The above mentioned test tubes were overnight incubated aerobically at 37ºC, and then were streaked onto 10% sheep blood agar (24 -48 h). Growing colonies were purified and identified morphologically by Gram's stain. Biochemically tested for motility, glucose and maltose fermentation, catalase activity and nitrate reduction were adopted **??**Quinn et. al., 2011).III.

5 Results

Parasitologically, all diseased buffaloes were infested with dark leathery flies identified as H. equina.

Adult flies were more abundant on stabled diseased animals. They mainly aggregated under the tail, on the udder, around genitalia and inner aspect of thighs. Flies were dark brown in color measuring 9 x 4.5-10.5 x

5.0 mm. Their abdominal segmentation was indistinct. Wings were longer than body length while wing veins crowded towards the anterior border. Flies had three pair of feet is provided with strong claws (fig: **??**). Five diseased buffaloes were infested also with sucking lice identified as H. eur. having a relatively short head and broad thorax and abdomen measuring about 4 x 2 -5 x 2.5 mm (fig: 2). Out of 8 full mature H. equina larvae creamy in color, oval shape measuring 1.5 x 2.5 mm provided with a small spine posteriorly, 5 pupated (6-10) hours (fig: **??**). Pupation period was 30 days where the pupa is broadly oval with two round postero-lateral spiracular lobes producing a full mature fly. Pupa was yellowish in color measuring 4.0 x 2.5-4.5 x 3 mm. It was soft and covered with sticky layer but at 24 hours later, it became dark red to black in color and quit hard (fig: **??**). (Selim 2001,).

Basing on nitrate reduction test, the identification of bacterial isolates all over the study revealed that both C. ps. biovars were recovered as C. ps. Equi and C. ps. Ovis represented 72 & 28 %, while from buffaloe lesions resembled 68.5 & 31.5% respectively (Table **??**). Some studies stated that OSD is associated only with C. ps. Equi (Selim 2001, Selim et al 2016, Viana et al 2017), while others detected both C. ps. biovars as causative agents in cattle ulcerative lymphangitis **??**Yeruham et.al.,1997 **??**eruham et.al., 2003 **??** Yeruham et.al., 2004).C. ps. transmission among buffaloe is a conflicting issue since some studies concluded that it is only mechanical by insects (Khalel et al., 1995 protrusion that can pierce the thick buffalo skin. These conditions coordinates with H. equina features which remain for long periods on their hosts and are not easily disturbed in addition it has very long mouthparts are adapted for piercing thick skin (Selim 2001). In the present study, out of 44 affected buffaloe cows, 43 showed closed (edematous or nodular) lesions avoiding suggestion of mechanical transmission unless through piercing the whole skin thickness to contract the pathogens from the infected subcutaneous tissues, the condition presented only related to H. equine (Selim 2001) when be with contaminated piercing mouth parts.

Even, from the blood sucking H. eur. lice with piercing mouth part just a vessel feeder could not reach to the infected subcutaneous tissue (Roberts and Janovy 1996), the present study failed to isolate any C. ps. strain from H. eurysternus lice infesting the infected buffaloes in different locations (Table **??**) suggesting that it cannot act as a mechanical or biological vector for C. ps. These finding concluded that not any blood sucking insect has role in transmission, but among blood sucking insects, it is associated with H. equine (Selim 2001, Ghoneim et al 2001). Musca domestica (house flies) with mouth part adapted only for a liquid diet not to pierce host skin (Kettle 1990) have been confirmed as potential vectors for C. ps. equi among horse (Yeruham et al., 2003 andSpier et al., 2004) or cattle(Abou-Zaid and Hammam, 1994; Sayed, 2001)with ulcerative lesions mechanically. C. ps. equi survival inside the fly's gut experimentally -on feeding house flies on C. ps. equi broth -revealed that the pathogen presented in fly droppings for only up to 4 h and in saliva up to 3 h post infection (Yeruham et al 1996). Some studies investigated the existence of the C. ps.equi inside Musca domestica by PCR detection of its phospholipase D (PLD) exotoxin gene (Spier et al 2004, Barba 2015) with great disadvantage that detection of PLD did not inform about the viability of pathogens. In the present study bacterial isolation of C. ps. biovar equi from all H. equine life stages(adult flies, their pupae either gathered or lab deposited as well as the second generation flies) viable up to 30 days post collection ascertained that there is endosymbiosis nature of C.ps. limited only to H. equina fly which can transmit C.ps. vertically.

The study concluded that both C. ps. biovars (equi & ovis) could be isolated from buffaloe OSD lesions. Its transmission is associated only to H. equina fly, the mechanical and biological vector for buffaloe OSD, since it is proved that there is endosymbiosis nature of C.ps. limited only to H. equina fly which can transmit C.ps. vertically. [1]

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Figure 1: 2 .

Figure 2: Fig

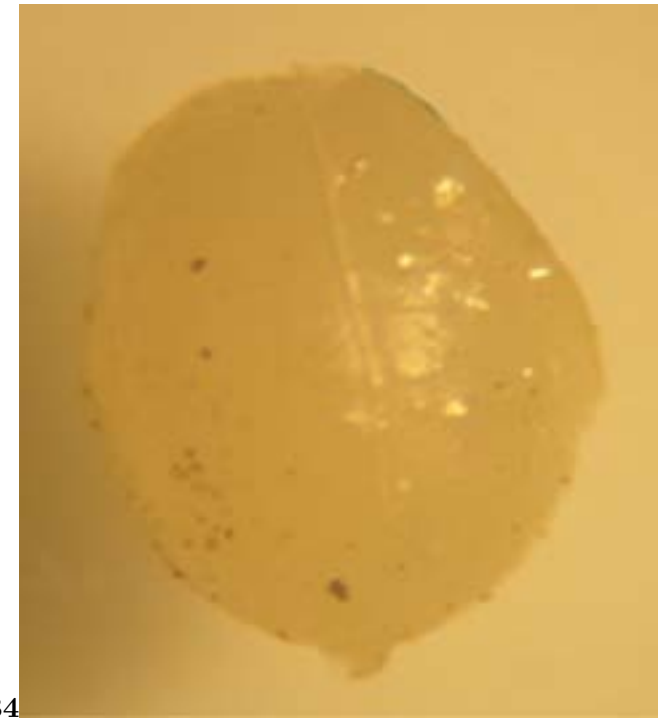

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Figure 3: Fig. (3)Fig. (4)

II. Material & Methods

a) Insects sampling
Through a private clinic in Fayama village (15 Km. east north from Assiut city, Assiut Governorate) the study conducted on 44 buffaloe cows -owned and hosted sporadically -suffering from OSD ectoparasite infested, where 70 adult blood sucking insects (40 H. equina flies & 30 H. eur. lice) were gathered.22 H. equina flies as well as 20 H. eur. lice were used for bacteriological examination and the rest were used in parasitological investigation.

Figure 4:

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Skin lesion samples	35	24	68.5%	11	31.5%
H. equina flies	13	10	76.9%	3	23.1%
Pupae	2	2	100%	0	0%
Total	50	36	72%	14	28%

[Note: 1): Nitrate reduction (NR) test of C. ps. isolates. Source of bacterial isolation No. C. ps. equi C. ps. ovis]

Figure 5: Table (

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Bacterial isolate species +ve bacterial isolation	Lesion exudate Samples 40	H. equina buffaloe hosted EBS	IBS	F
C. ps.	32	2	6	-
C. ps. + S. epid.	3	-	-	-
C. ps. + Anthr.	-	1	2	-
S. epid.	5	-	-	-
S. sapr.	-	-	2	-
Anthr. spp.	-	19	12	9
S.sap. + Anthr.	-	-	-	1
-ve bacterial isolation Total IV. Discussion	4 44	22		2

OSD appears mainly among buffaloes and occasionally cattle in

Figure 6: Table (2

Figure 7:

[Quinn] , P J; M Quinn .

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