PROCEEDINGS OF THE 11th WORLD RABBIT CONGRESS
Qingdao (China) - June 15-18, 2016
ISSN 2308-1910

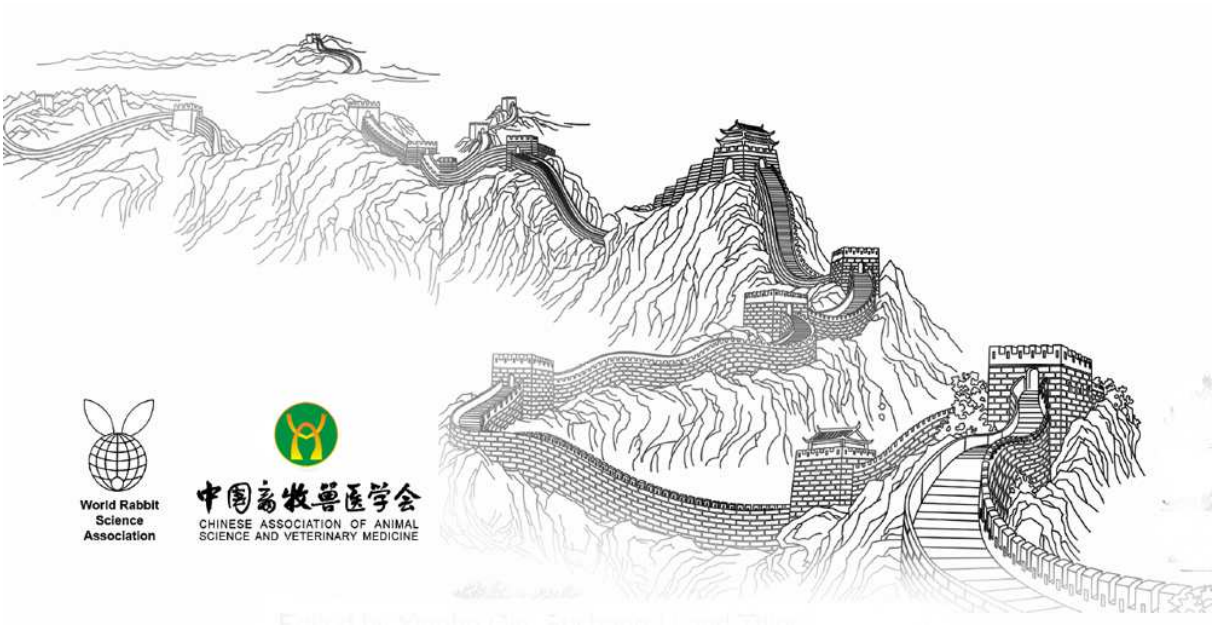
Session
Pathology and Hygiene

Kimsé M., Dakouri S.A., Koné M.W., Komoin O. C., Coulibaly M. , Yapi Y.M., Fantodji A.T., Otchoumou A.

RABBIT'S COCCIDIAN SPECIES IN A TROPICAL ENDEMIC AREA..

Full text of the communication

How to cite this paper :
Kimsé M., Dakouri S.A., Koné M.W., Komoin O. C., Coulibaly M. , Yapi Y.M., Fantodji A.T., Otchoumou A., 2016. Rabbit's coccidian species in a tropical endemic area. *Proceedings 11th World Rabbit Congress - June 15-18, 2016 - Qingdao - China, 541-544.*



RABBIT'S COCCIDIAN SPECIES IN A TROPICAL ENDEMIC AREA

Kimsé M[1*]., Dakouri S[1]. A., Koné M. W.[1], Komoin O. C.[2], Coulibaly M.[2] , Yapi Y.M.[3], Fantodji A.T.[1] and Otchoumou A.[1]

[1]Pôle Production Animales, UFR Sciences de la Nature, Université Nangui Abrogoua, 02 BP 801 Abidjan 02 , Côte d'Ivoire
[2]Laboratoire Central Vétérinaire de Bingerville (LCVB), Côte d'Ivoire.
[3]Laboratoire de Zootechnie et Productions Animales, Ecole Supérieure d'Agronomie, Institut National Polytechnique Félix Houphouët Boigny, BP 1093 Yamoussoukro, Côte d'Ivoire
[*]Corresponding author: kimsemous_sn@una.edu.ci

ABSTRACT

The identification of rabbit's coccidian in an area within a high density of rabbit livestock has been undertaken in Cote d'Ivoire in 2014. This study aimed to prevent an epidemic infection caused by coccidian through rabbit's husbandries in the city of Abidjan. A number of 920 rabbits (*Oryctolagus cuniculus*) with 500 to 3500g weight from 18 livestock were considered. They were at different physiological stage (growing and breeding). Mac Master's method has been used to evaluate the degree of infestation of rabbit's feces. 11 species of coccidian have been identified by this method based on the time of sporulation and sized of parasites. It has been recorded a high charges of parasites (P=0.02) within rabbits aged 45 to 120 days. Coccidian charges of growing rabbits are 4 times important than breeding one. The number of coccidian oocysts per g of feces (OPG) in modern husbandries was 5, 2 times higher than traditional one (P= 0.04).
Key words: Emeria, rabbit, Côte d'Ivoire

INTRODUCTION

Coccidian infestation is a frequent pathology encountered in rabbit livestock (Henneb *and* Aissi, 2013). The genus *Eimeria* has been identified as the most dangerous species of coccidian causing a high rate of rabbit mortality and growth delay (Burgaud, 2010; Thoto, 2006). *E. intestinalis* and *E. flavescens* caused severe weight loss and mortality beyond 50% in rabbit livestock (Coudert *et al*., 1995; Ming-Hsien *et al*., 2010). The aim of this study is to investigate rabbit coccidian species encountered in Côte d'Ivoire, the risk of infection in order to develop an effective prevention diagram for this pathology.

MATERIAL AND METHODS

Study environment and animal management

Data were collected at Bingerville a suburb of Abidjan from December 2013 to April 2014. According to Kimsé *et al.* (2016), this suburb contains the quarter of rabbit livestock that can be found in the district of Abidjan. Samples of 920 rabbits (*Oryctolagus cuniculus*) from 18 husbandries, with weight between 500 to 3500g have been considered. Growth Animals' ages were between 45 to 120 days and at least 6 months for breeders. Rabbits were feeding with food without anticoccidial. Feces that not having contact with the ground have been collected between 6 a.m. to 8 a.m. through plastic canvas pieces arranged under the cages. The discharges were purged of all food detritus and stored in plastic fecal pots and refrigerated at 4 °C until examination.

Oocysts counting and enumeration of different species of coccidian

Samples have been made in 4 small-scale rabbitries (SR), 4 large-scale rabbitries (LR) and 10 improved small-scale rabbitries (ISR) based on Coulibaly (2014) description model of rabbit

husbandry systems in Côte d'Ivoire. Ten reproduction cages and 10 fattening cages were chosen in large-scale rabbitry and improved small-scale rabbitry and 5 reproduction hutches and 3 fattening hutches in small-scale rabbitry. Sampling were regrouped according to the physiological stages to give 10 samples for I S-C R, 4 for S-S R and 4 for L-S R too for reproduction and also for growth. For each homogenized sampling of each livestock, 100 g of samples were performed to determine coccidian's oocysts per gram (OPG) and *Eimeria* species.

Feces analysis method

Mac Master's method has been used to examine the percentage of coccidian contained in feces collected. 3 g feces has been diluted in 45 ml water. The mixture was sifted through a fine mesh sieve to remove coarse particles. The filtrate was poured into 23 ml tube and centrifuged during 5 min at 2000 revolutions per min. The sediment was homogenized using a rod with 5 ml of the flotation liquid (NaCl: d = 1.20) and test tube was filled to the brim. 0.15 ml were collected and put into each McMaster slide chambers. After 10 min, the coccidian oocysts glued under the top glass were observed using an optical microscope (x 100). Counting was performed following the columns engraved in both McMaster slide chambers. We have multiplied this number by the dilution factor (100) to obtain an estimation of coccidian oocysts in feces collected.

Enumeration of species and different types of coccidian infestation

The species and the type of coccidian infections is based according to Coudert *et al.* (1995) on some changing observed in the structure of its oocysts after culture. A sample of 15 g of feces was incubated in petri dishes containing blotting paper at laboratory temperature. The preparation was rehydrated daily using 2.5% $K_2Cr_2O_7$ and examined periodically to determine mean sporulation time using flotation technique. The oocysts were observed under a light microscope at 40 x magnification. Sporule size was measured after pinpointing at 10x magnification next, micropyle and residual bodies sizes were measured at 40x magnifying power. The length and width of sporule were obtained by using an ocular micrometer mounted on a light microscope (100 x M).

Statistical analysis

The number of coccidian oocysts per g of feces (OPG) excreted by growing animals was compared with those of breeding in the 3 types of livestock using Student's t-test. The number of coccidian oocysts encountered in the 3 types of breeding were tested with AV1 and compared in pairs by Newman and Khi-2 test to identify which farming systems is the most infected. Length and width of sporulated oocysts were compared to the average values obtained by Licois (1995). All comparisons were made at threshold of 5% with STATISTICA.7 software.

RESULTS AND DISCUSSION

Coccidian oocysts according to the type of farming and the age

Coccidian have been observed in all the farms considered. The coccidian oocysts load average OPG within young rabbits from 45 to 120 days was 4 times higher than breeders one (P = 0.02; Table 1), but no significant differences were observed between the 2 age groups in small-scale rabbitry and in improved small-scale rabbitry too. The averages registered are 4441 and 15070 OPG respectively in small-scale and in improved small-scale rabbitry. However, in large-scale rabbitry, the number of coccidian oocysts in growing rabbits tends to be 5.8 times higher than breeding one (P = 0.08). The OPG in large-scale rabbitry is 5.2 times higher than the one of small-scale rabbitry (P = 0.04). But, there is no difference between small-scales rabbitry and those of improved small-scales rabbitry, the same is true for the last ones and large-scale rabbitry. The automatic treatments in large-scale rabbitry permit to reduce considerably the coccidian load. On other hand, immunity acquired by repeated contacts between animals and pathogens induced a sharp decline in coccidian load. All this would explain the high charge of coccidian observed in large-scale rabbitry compared to small-scale one. Indeed, in the so-called large-scale rabbitry, the large number of growing animals weakened by a fragile immune system still not established within the increasing of the coccidian load (Henneb *and* Aissi, 2013) in contrast to small-scale rabbitry (Thoto, 2006).

Table 1: Mean oocyst expense (OPG) growing and breeding in rabbits

Breeding type	*Breeding number*	Young	Breeders	*t value*	*P>F*
Small-scale	*4*	4 768 ± 2457	4 113 ± 5077	*-0,27*	*0,80*
Improved small-scale	*10*	24 380 ± 47360	5 760 ± 8509	*-1,49*	*0,16*
Large-scale	*4*	39 638 ± 22859	6 788 ± 8176	*-2,59*	*0,08*
Total	*18*	23412 ± 37750	5622 ± 7453	*-2,44*	*0,02*

Identification of different species of coccidian

Coccidian species sporulation time has been found from 2 to 5 days. Eleven *Eimeria* species named *E. perforans, E. piriformis, E. exigua, E. media, E. magna, E. coecicola, E. vejdovskyi, E. flavescens, E. intestinalis, E. irresidua* and *E. stiedai* were isolated from the rabbit's feces. This result has also been obtained by Akpo *et al* (2011) in Benin. The high number of coccidian species would come from the humid tropical climate that prevails there. This type of climate is favorable to the coccidian's survival and proliferation (Razavi *et al*., 2010). Contrary to this climate zone, 6 and 9 coccidia species were respectively listed at 22.2 ° C in Iran and in Saudi Arabia at 25 ° C (Abdel-Azeem *et al*., 2013; El-Shahawi *et al*., 2002; Razavi S. *et al*., 2010).

The morphometric measurements of the oocysts of these *Eimeria* species registered are shown in Table 2. This study has shown a high percentage (83, 33%) infection with 3 species of coccidian. Thus, the majority of these coccidian species are characterized by sporulated oocysts which size were greater than those observed by Licois (1995) at 22 ° C. The sporulation time is relatively longer at 27 ° C on average than the one observed by the same author at 22 ° C (2-5 days vs. 2-4 days).

The difference of measurement observed for each coccidian species would come from the variability existing in size within a species (Licois, 2010). But, the sporulation time difference would be explained by the fact that it is strongly influenced by various factors including population density of coccidian oocysts, oxygenation, humidity and ambient temperature (Burgaud, 2010; Rind *and* Brohi , 2001). Furthermore, mixed infection was the most frequent that is in accordance with those of the previous studies (Razavi *et al*., 2010; Yakhchali *and* Tehrani, 2007).

Table 2: Comparison of coccidian species measurements to control average obtained by Licois (1995).

Eimeria	Number	Length (µm)				Width (µm)			
		OA	CA	*Error-T*	*P>F*	OA	CA	*Error-T*	*P>F*
E_1	11	40.7	34.5	*0.88*	*0.01*	26.6	19.7	*0.60*	*0.01*
E_2	11	17.6	20	*0.28*	*0.01*	17.0	20	*0.47*	*0 ,01*
E_3	11	39.5	30	*1.34*	*0.01*	30.2	21	*1.14*	*0.01*
E_4	5	27.4	26.8	*1.22*	*0.60*	21.7	18.9	*0.75*	*0.01*
E_5	8	41.0	35.2	*1.14*	*0.01*	26.9	21.9	*1.22*	*0.01*
E_6	9	44.2	36.3	*1.09*	*0.01*	31.5	24	*1.07*	*0.01*
E_7	11	35.6	31.1	*1.08*	*0.01*	18.7	17	*0.44*	*0.01*
E_8	12	25.3	22.2	*1.23*	*0.02*	17.0	13.9	*0.59*	*0.01*
E_9	11	34.4	29.9	*0.99*	*0.01*	22.2	18	*0.75*	*0.01*
E10	6	38.1	35.7	*1.43*	*0.14*	26.8	19.9	*2.09*	*0.02*
E_{11}	10	36.1	31.5	*1.04*	*0.01*	22.5	19.1	*0.84*	*0.01*

OA: Own Average; C A: Control Average

CONCLUSION

Eleven species of coccidian have been observed in the area of Bingerville in Côte d'Ivoire. These species have a huge size than those already known. The sporulation time was also larger. These characters are linked to the climate of the study area. The parasitic load is greater in rabbits fattening as breeding. It is the same for small-scales rabbitry or family type one compared to modern farming. Even so, this work requires further information on the prevalence of coccidian species in the different systems of rabbit breeding and their pathogenicity.

ACKNOWLEDGEMENTS

The authors thank Dr Okon Joel and ANADER for their assistance.

REFERENCES

Abdel-Azeem S., Abdel-Baki., and Al - Quraishy S. 2013. Prevalence of Coccidia (*Eimeria* spp.) Infection in Domestic Rabbits *Oryctolagus cuniculus*, in Riyadh, Saudi Arabia,. *Pak. J. Zool. 45:1329-1333*.

Akpo Y., Kpodekon M.T., Djago Y., Licois D., and Youssao I.A.K. 2011. Evaluation de l'innocuité des souches précoces de Emeria magna et de Emeria media issues du Bénin en vue de leur utilisation comme souches vaccinales. *Int. J.Biol. Chem.Sci. 5:1682-1687.*

Burgaud A. 2010. La pathologie digestive du lapin en élevage rationnel, Ecole Nationale Vétérinaire d'Alfort, Créteil.

Coudert P., Licois D., and Drouet-Viard F. 1995. Eimeria and Isospora. Eimeria species and strains of rabbits., p. 52-73, *In Eckert J., et al., eds. Biotechnology. Guidelines on Techniques in Coccidiosis Research, Office for official publications of the European communities ed. Office for official publications of the European communities, Luxembourg*.

Coulibaly K.A.S. 2014. Caractérisation des systèmes de production cunicole en Côte d'Ivoire, Mémoire de master Productions Animales, UFR-SN, Université Nangui Abrogoua, Abidjan, 41p.

El-Shahawi G., El-Fayomi H., and Abdel-Haleem M. 2002. Coccidiosis of domestic rabbit (*Oryctolagus cuniculus*) in Egypt: microscopic study *Parasitol. Res., 110:251-258.*

Henneb M., and Aissi M. 2013. Etude cinétique de l'excrétion oocystale chez la lapine et sa descendance et identification des différentes espèces de coccidies, *pp. 221-224 15èmes Journées de la Recherche Cunicole, , Le Mans, France*.

Kimsé M., Coulibaly K.A.S., Gnanda B.I., Zongo M., Yapi Y.M., Fantodji T.A., and Otchoumou A.A. 2016. Caractérisation des systèmes de productions cunicole dans le District d'Abidjan, Côte d'Ivoire. *Agronomie Africaine* (*Soumited)*.

Licois D. 1995. Affections digestives d'origine parasitaire et/ou infectieuse chez le lapin, pp. 109-132, *In Brugère-Picoux, (ed.) Pathologie du lapin et des rongeurs domestiques, 2ème édition, Paris.*

Licois D. 2010. Pathologie d'origine bactérienne et parasitaire chez le Lapin : Apports de la dernière décennie *Cuniculture Magazine. 37:35-49.*

Ming-Hsien L., Hai-I H., and H.-K. O. 2010. Prevalence, infectivity and oocyst sporulation time of rabbit-coccidia in Taiwan. *Trop Bio med 27:424-429*.

Razavi S., Oryan A., Rakhshandehroo E., A. Moshiri, and Mootabi Alavi A. 2010. Eimeria species in wild rabbits (Oryctolagus cuniculus) in Fars province, *Iran Trop Bio méd . 27:470-475.*

Rind R., and Brohi M. 2001. Factors affecting the survival and the sporulation of Eimeria oocysts of cattle. *Pakistan J. of Biol. Sci. 4:487-491*.

Thoto M. J. 2006. Utilisation de la Robénidine (Cycostat ND 66 G) en qualité d'additif anticoccidien dans l'aliment : effet sur la croissance et le degré d'infestation des lapins à l'engraissement., Ecole Inter Etats des Sciences et Médecine Vétérinaires, Dakar, 85p.

Yakhchali M., and Tehrani A. 2007. Eimeriidosis and pathological findings in New Zealand white rabbits. . *J. of Biol. Sci. 7:1488-1491*.

==========