

Reproductive Performance and Fattening Potential of both Ovine and Caprine breed Djallonkéor Naine (Dwarf) : A Review

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Abstract— This review show some performances from both ovine and caprine breed Djallonké in their humid tropical region of West Africa. On one part their individuals good reproductive performances (prolificity, fertility, lambing or kidding interval, birth weight, daily weight gain) and their females body, udder or teat physiological characteristics are reported. On other part their fattening potential or relative good slaughtering performance are also reported. Suggesting that the current development of sustainable and productive breeding in both ovine and caprine breed Djallonké can permit to reach a higher covering of humans needs in these small ruminants meat from this region of the world.

Index Terms— Djallonké- Reproductive - Lambing or Kidding interval- Daily weight gain -Fattening- sustainable.

I. INTRODUCTION

In Côte d'Ivoire such as others countries around the humid tropical region from West Africa, the both locals ovine and caprine breed *Djallonkéor Naine : Dwarf*, are breeding mainly for meat production of humans food. These small ruminants are an important socio-economic role and are used as husbandry of subsistence in rural areas. However, the humans needs in ovine and caprine meat are covered at 18% by small ruminant meat production in Côte d'Ivoire (FAO, 2016). Thus, the sustainable and productive systems of small ruminant breeding for meat production can have an important contribution in animal proteins supply. That require the control of the sustainable fattening from both locals ovine and caprine breed *Djallonké*. In Côte d'Ivoire, some studies were conducted on fattening in locals bovine breeds as *N'Dama* (Hoste et al., 1982ab; Jouve and Letenneur, 1972 ; Lhoste and Cloe, 1982) and *Baoulé* (Tidori et al., 1975 ; Hoste et al., 1982ab ; Lhoste et Cloe, 1982 ; Yo et al., 1990). In the same way, few studies were conducted in the local ovine breed *Djallonké* (Rombaut and Van Vlaenderen, 1976 ; Rombaut, 1980 ; Berger et Ginisty, 1980 ; Poivey et al., 1982 ; Gadji and Oya, 1988). However only one unpublished study was reported in the local caprine breed *Djallonké* (cited by Amégée, 1986) although a few studies were conducted on fattening of these small ruminants in some countries of West Africa.

The local ovine breed *Djallonké* is physiologically adapted to humid tropical region (Rombaut et Van Vlaenderen, 1976 ; Rombaut, 1980 ; Poivey et al., 1982) such as a local caprine breed *Djallonké* in this same environment as reported in some caprine breeds in humid tropical region (Alexandre et al., 2012) and/or harsh environments (Silanikove., 2000 ; Alexandre and Mandonnet, 2005). The both ovine and caprine breed *Djallonké* are more trypanotolerant than local bovine breed (Mawuena, 1987). Their pregnancy (± 5 months) is known to be short than that of bovine breed (± 9 months). The local ovine breed *Djallonké* oestrus can induce and synchronised with hormone (Touré et al., 1995). In ovine and caprine breed *Créole* from humid tropical region the male effect has been used to induce oestrus and synchronisation (Chemineau et al., 1991; Alexandre et al., 2012) as a bio-stimulation method. Furthermore there is no seasonal anoestrus in the females from *Djallonké* breed (Vallerand and Branckaert, 1975 ; Rombaut and Van Vlaenderen, 1976 ; Poivey et al., 1982 ; Amégée, 1983). Thrice kidings for two years are used in caprine breed (Alexandre et al., 2012). Twice yearly lambings made in ovine breeds from temperate regions (Whiteman et al., 1972). In the same way twice lambing for year or thrice lambing for two years has been experimented in local ovine breed *Djallonké* with natural and/or artificial reproduction (Rombaut, 1980 ; Poivey et al., 1982 ; Charray, 1986).

The prolificity rate of caprine breed *Djallonké* can reach 1,85 (Tuah et al., 1990, cited by Missohou et al., 2016). That from ovine breed *Djallonké* can reach 1,70 (Vallerand and Branckaert, 1975). The higher fertility rate (95%) was observed from this last breed (Berger and Ginisty, 1980). Furthermore Charray (1986) obtained a fertility rate of 65% in this tropical breed under intensive reproduction as against 60 - 62% reported in temperate breeds under intensive reproduction (Land and Mc Clelland, 1971 ; Whiteman et al., 1972).

The good prolificity of both ovine and caprine breed *Djallonké*, their good adaptation to humid tropical regions and their reproductive possible intensification are interesting for improvement meat production by sustainable fattening of these small ruminants useful for zoogenetic resources conservation. This review show and discuss the reproductive performance and fattening potential and

indicates the slaughtering performance of both ovine and caprine breed *Djallonké* in their humid tropical environment.

II. DISCUSSION

I- Reproductive performance from both ovine and caprine breed *Djallonké*

Intensive reproduction in both ovine and caprine breed *Djallonké*

The pregnancy period in both ovine and caprine breed *Djallonké* is approximately 5 months as known in others small ruminants breeds. Furthermore, Rombaut (1980) reported the lack of suckling anoestrus in ovine breed *Djallonké*. Thus thrice lambing and/or kidding for two years are possible for intensive reproduction in both ovine and caprine breed (Charray, 1986; Chemineau et al., 1991; Alexandre et al., 2012). Furthermore twice lambing for year have been used in ovine breed *Djallonké* for intensive reproduction within four years (Charray, 1986). However, this author recommended 7 months as lambing interval for intensive reproduction in ovine breed *Djallonké* under rational husbandry because none ewe performed 8 lambings within the four years of the experiment. Nevertheless, some ewes under twice lambing for year performed 7 lambings during this experiment. This last lambing interval (7 months) is short than 8 months reported in this breed under traditional village or rational conditions (Vallerand and Branckaert, 1975; Rombaut and Van Vlaenderen, 1976; Berger et al., 1980; Symoens and Hardouin, 1988). The individual variability in lambing interval suggest that the ewes may be selected for intensive reproduction according this reproductive parameter (Charray, 1986) especially as heritability (0,46) was showed for this criteria in ovine breed *Djallonké* (Vallerand and Branckaert, 1975). Indeed, the herd productivity from rational husbandry is more with lambing interval of 7 months than that of 8 months and then more economic (Charray, 1986). There are no references in our knowledge about the kidding interval in local caprine breed *Djallonké* under thrice kidding for two years or twice kidding for year. The experiment for 7 months as kidding interval and thrice kidding for two years or twice kidding for year may be conducted in local caprine breed *Djallonké* for knowing his kidding interval to be selected for intensive reproduction.

Critical period from 0 - 30 days age in both ovine and caprine breed *Djallonké*

The first 30 days after lambing or kidding are showed as the critical period of lambs or kids survival in both ovine and caprine breed *Djallonké* (Osugwuh and Inwang, 1987; Abassa et al., 1992). Indeed, Amégée (1984) showed a positive correlation between the milk suckled and the growth of the lambs within these first 30 days. Thus, Amégée (1984) recommended as previous authors the supplementation of dams during suckling period and the practise of the adoption

when the number of the lambs is more than two for some ewes. Also, the kids mortality rate was lower when their dam have a high udder circumference (≥ 16 cm), small teat circumference (≤ 4 cm) and body weight ≥ 24 kg (Osugwuh and Inwang, 1987). That may be explain by the high milk yield from high udder and suckling facility from small teat. These last authors suggest the selection based on the physical characteristics : body size, udder and teat for preventive early losses from kids. They suggested also a study about the relationship between these physical characteristics and milk yield from caprine breed *Djallonké*. That study may be conducted in ovine breed *Djallonké*. Nevertheless, relationship between morphological udder measurements and milk production has been reported in some caprine breeds (Linzell, 1966; Mavrogenis et al., 1989). Also the wide variability in udder cisternal milk has been observed in caprine breed *Alpine* (Komara et al., 2009).

Moreover the high mortality rate among lambs or kids within the first days in humid tropical regions have been associated with the cold periods of the year because the cold predispose lambs or kids to such killing diseases like pneumonia and PPR (Peste for small ruminants) (Osugwuh and Akpokodje, 1981 cited by Osugwuh and Inwang, 1987; Mourad and Baldé, 1997). However, the improvement of the management system in humid tropical regions such as control of breeding, pastures management, supplementation, housing, basic medical prophylaxis, prevention or systematic treatment of internal and/or external parasites can reduce lambs or kids mortality rate and diseases or parasites incidence (Mawuena, 1987; Symoens and Hardouin, 1988, Mourad and Baldé, 1997). Furthermore, Mawuena (1987) reported the high level of tolerance to trypanosomiasis from the both small ruminants ovine and caprine breed *Djallonké*. However, he recommended the administration of trypanocide to dams before and after lambing or kidding to avoid the lambs or kids mortality within the first 30 days. The rotating natural or improved pastures or artificial pasture in herd feeding management or biological control or host-parasite interaction can be used for parasites fighting from the both breed ovine and caprine breed such proposed for others small ruminants breeds (Torres-Acosta and Hoste, 2008; Mahieu et al., 2009). That will avoid the transmission of the parasites from dams to lambs or kids within the suckling period and limit gastro-intestinal parasitism.

The wide variability in birth weight has been reported in both ovine and caprine breed *Djallonké*. For example some lambs or kids performed 2-3 kg as birth weight (Vallerand and Branckaert, 1975; Rombaut and Van Vlaenderen, 1976; Rombaut, 1980; Dhollander et al., 2005). Thus Rombaut (1980) and Abassa et al. (1992) suggested lamb selection based on birth weight that when the lambs birth weight reach 3 kg their body weight can reach 40 kg at 525 days age (17.5 months age; Rombaut, 1980). However this author

recommended that the male and female must be mating their first reproduction at 12 or 18 months and 8 months age respectively.

Daily weight gain in both ovine and caprine breed Djallonké from 0 – 120 days age

The daily weight gain (DWG) from birth day (0 d) to weaning at 120 days (120 d : 3 months, as pre-weaning period) has been determined in both ovine and caprine breed *Djallonké* by some authors around some countries from humid tropical region in West Africa. The wide variability was observed in DWG with some lambs performing 115 g/d (Rombaut, 1980) such as 115 g/d performed by caprine cross-breed (*Djallonké* x *Saanen*) during pre-weaning (Dhollander et al., 2005). Thus, lambs and ewes selection based on DWG was suggested (Rombaut, 1980; Abassa et al., 1992; Tuah and Baah, 1985). The positive relationship between lambs birth weight and their DWG within the first 30 or 60 d from pre-weaning period was demonstrated (Berger and Ginisty, 1980; Abassa et al., 1992). The lambs pre-weaning survival rate was not different when the ewes performed twice lambings for year or thrice lambings for two years (87 vs 88 %, respectively; Charray, 1986).

Weaning weight at 120 days age in both ovine and caprine breed Djallonké

The weaning weight at 3 months age was lower from animals managed under traditional village condition than those managed under husbandry improved (7 vs 13 kg, respectively; Rombaut and Van Vlaenderen, 1976). Furthermore, the supplementation plus natural pastures within the production period is economic and improved the weaning survival rate (Berger and Ginisty, 1980). In the same way the lambs raised on improved pastures showed high performance than those maintained on natural pastures that demonstrated feeding importance during or after only suckling period (Abassa et al., 1992). These authors reported also the high performance of lambs from lambing of the end or beginning of dry season. However, Mourad and Baldé (1997) reported the lack of lambing or kidding during the cold or dry season in animals under their traditional village conditions on contrary to Symoens and Hardouin (1988) that showed the dry season as better for lambs growth. In agreement with the higher weight of lambs from the dry season lambings within the first 3-5 months age (Poivey et al., 1982; Symoens and Hardouin, 1988). Furthermore, a lack of seasonal anoestrus was reported in both ovine and caprine breed *Djallonké* under traditional village or rational conditions in humid tropical region from West Africa (Vallerand and Branckaert, 1975; Rombaut and Van Vlaenderen, 1976; Berger and Ginisty, 1980; Poivey et al., 1982; Amégée, 1983). Nevertheless, Mourad and Baldé reported the lack of husbandry management in the herds from their study and then recommended these husbandry management improvement by zootechnic actions. The more higher weaning weight (for example 15 – 17 kg) at 3

months age were reported in ovine breed *Djallonké* (Berger and Ginisty, 1980; Charray, 1986; Fall et al., 1983ab) suggesting the selection of the lambs with higher weaning weight (> 12 kg) on this criteria. Indeed none difference was obtained in post-weaning growth (107 g/d) from lambs performing 8 or 12 kg as weaning weight (Berger and Ginisty, 1980). However, these last authors observed a wide individual variability in post-weaning weight with some lambs performing 150 g/d and then suggested a possible improvement of growth performance by selection based on this criteria.

II- Fattening potential in both ovine and caprine breed Djallonké

Fattening potential from ovine breed Djallonké

The wide variability in daily weight gain (DWG) has been reported in lambs within post-weaning (85 – 150 g/d) in ovine breed *Djallonké* (Berger and Ginisty, 1980; Rombaut, 1980). These authors observed the sex effect (male > female) and the positive effect of supplementation plus natural pastures in agreement with results known in local bovine breeds (Hoste et al., 1982a). Furthermore the positive effect of weaning on fattening was reported in ovine breed *Djallonké* (Berger and Ginisty, 1980; Rombaut, 1980). The DWG of 110 g/d as fattening result was reported in ovine breed *Djallonké* (Unpublished; cited by Amégée, 1984). To our knowledge there are little references about fattening from ovine breed *Djallonké*. Nevertheless, Rombaut and Van Vlaenderen (1976) provided this ovine breed needed to maintenance and production for different age stage and the forage allowance to energy or proteins. These data can be used for fattening and then a possible growth performance selection from ovine breed *Djallonké* that relative good slaughtering performance ranged 45 – 50 % (Vallerand and Branckaert, 1975; Rombaut and Van Vlaenderen, 1976) although the breeder-fattener system in this ovine breed has been reported as economic (Touré, 1988).

Fattening potential from caprine breed Djallonké

The daily weight gain (DWG) was higher in kids early castrated (6 months age) than those from late castrated (12 months age) within 12 weeks from fattening (57 vs 49 g/d, respectively; Amégée, 1986) in agreement with results observed in ovine breed apparented to *Djallonké* (Thys et al., 1990). Furthermore uncastrated male are known for best feed efficiency within fattening and better slaughtering performance for meat production (Hoste et al., 1982ab, Lhoste and Cloe, 1982; Thys et al., 1990). Furthermore, the castration more traumatic (Thys et al., 1990) induces pain in ruminants and then a partial impairment of their welfare. The DWG obtained (49 or 57 g/d) in caprine breed *Djallonké* (Amégée, 1986) remains higher than those (21, 31 or 36 g/d) reported in this caprine breed (Borton and Assiedu, 1972; CRZ, 1980; Mba et al., 1974, respectively; cited by Amégée, 1986). That could be explained by low number of the animals used by these authors in their studies according

Amégée (1986). Considering the fact that these authors reported the DWG average values and then an individual variability in animal biological response, the studies remains conducted on fattening in caprine breed *Djallonké* for selected the animals performed the higher DWG. Indeed, a relative good slaughtering performance (48% of liveweight) has been reported in this caprine breed (Amégée, 1986).

CONCLUSION

The both ovine and caprine breed *Djallonké* known as adapted to humid tropical region from West Africa with high level of tolerance to trypanosomiasis from this environment, showed some individuals good reproductive performances (prolificity, fertility, productivity, lambing or kidding interval, birth weight, daily weight gain...). Furthermore the female of these both small ruminants have some individuals physiological characteristics (body size, udder and teat circumferences) suggesting their possible selection based on these criteria. Thus some studies including their physiology of reproduction or lactation, feeding or nutrition, behavior or welfare, genetic and pathology or diseases with low negatives environmental impacts are required for improvement of the meat production by sustainable and productive fattening or breeder-fattener systems. Then the higher covering of humans needed of small ruminants meat will be reached in Côte d'Ivoire or some countries around West Africa humid tropical region as a best response to their needed in proteins animals.

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