The aim of this study was to review the morphological features of Large White and Kolbroek pig breeds. Kolbroek is a South African indigenous pig breed with unique genetic traits for diseases tolerance and adaptability in harsh environmental condition and Large White is the most popular exotic breed in South Africa due to their fertility and growth rate also known as a Lard Pig by virtue of its huge accumulation of fat, is characterised by slow growth rate. Although the exotic and indigenous pigs has a different growth may research found no different morphological features on their head length and snout, but differ in their body length and rump height, and found that the male pigs had long and strong legs than female sex. Body measurement record shows that the indigenous breeds are general smaller than the exotics pig and their crossbreed. The information obtained from this review can provide the magnitude of these differences between indigenous and exotic breeds in extensive and intensive production systems. This can in turn help the communal farmers since the value of their indigenous breeds can be realized.

**Key words:** Pigs, morphological, growth performance, exotic, effect.

**INTRODUCTION**

Morphological description is useful for distinguishing animal breeds and strains, and to evaluation of animal goals. Comparative measurements of morphological traits can provide evidence of breed relationship and size, and some cease to predict an animal weight (Kugonza et al., 2011). Ayalew et al. (2011) found that the male pig has higher heart girth and body length compared to female pigs. According to Mavule et al. (2012) biological relationship existing among the linear body variable may be different if the body measure are treated as depending on two variable rather than two or more variable and reported that many researchers have used body measurement in describing morphological structure of different livestock species. Furthermore, linear body measurement together with body weight describes more complete individual or population than
Growth performance of Kolbroek pig breeds

Kolbroek is an indigenous pig breed characterized by tolerance to various diseases, ability to utilize fibrous and poor quality of feed resource as compared to the Large White breed. Indigenous pigs are the main source of livelihood for various communities worldwide. The genetic resources in South Africa are exposed by sporadic disease outbreak and indiscriminate crossbreeding. The production traits like litter size and mortality rate are important for measuring efficiency of breeding practice. They have a potential to produce good litter size and attain lower pre-weaning under limited resource conditions. Farmers select the indigenous pig for large litter size, fast growing and meat quality.

Indigenous breeds are generally early maturing and they reach puberty at three months. At five to six month, the general recommended age for slaughter indigenous breeds will be having an average weight ranging from 35 to 40 kg (Chimonyo et al., 2005). Their average daily gain (ADG) is 480 kg per day when kept in extensive production system. This ADG declines as they reach maturity. In extensive production system indigenous breeds have high growth rates because of their ability to utilise fibrous diets, which are found in abundance in communal farming areas. The average daily gain of indigenous breeds increases with the increasing amounts of dietary fibre in the feed. Chimonyo and Dzama (2004) reported that the rate of live weight gain for indigenous breeds is high when fed with fibrous diets because they have low energy for maintenance requirements.

When subjected to intensive production system indigenous breeds attain low body weights per amount of feed consumed. This means that their production will be at very high costs since there will be no efficient feed utilisation for maximum profit. Commercial feeds are made specifically for improved breeds. In general indigenous breeds are then considered to be low prolific because of their performance in intensive production systems. Although they are low productive intensively their production in extensive production system is justified because they will be producing at low costs.

Growth performance of Large White pig breeds

Large White is the most popular exotic breed in South Africa due to their fertility and growth rate. It is not suitable for poor resources and harsh environment condition (Masenya et al., 2011). Large white pig breed originated in Yorkshire. They are most commonly found in England and Ireland though they can be found everywhere around the world. They are distinguished by their long, bony legs, erect ears, long length and large frame size. They are tough, rugged breed that can tolerate fluctuation in their climate and environment, making them an ideal breed for commercial markets around the world. The large white performs very well under intensive farming condition though they were originally bred to be extensive. They often have large litter offspring and have exceptional maternal instincts to compliment their litter size. The lean have a high muscle mass. They produce high quality meat. Exotic breeds generally have excellent growth performance in terms of growth rates and lean meat in intensive farming system (Tang, 2008). This is because they have been developed very well for high productivity when fed with commercial feeds. The average daily gain of exotic breeds in intensive pig production system is 890g/day. The average slaughter weight (from five to six months) is 80 to 110kg. Under extensive production systems exotic breeds attain low growth rates than when kept under intensive production systems. According to Kanengoni et al. (2004), exotic breeds fed on high fibre diets of maize cob have low rate of live weight gain. Their growth performance decreases because the feeds available in extensive farming cannot meet their metabolic needs. According to Hoffman et al. (2003), exotic breeds consume 1702.27 g/pig/day in intensive production compared to 1368.31 g/pig/day in extensive production. The average daily gain of exotic breeds decreases with the increase in the fibre content in the feed. Besides the fact that fibrous feeds cannot meet their metabolic needs, exotic breeds are also not adapted to high fibre diets which cause them not to consume much.

Morphological features of indigenous (Kolbroek pig) breeds

Indigenous livestock has played a significant role in smallholder farm and local population for a long time. They have been kept using low input but they still engender their product and by-product to meet household needs (Charoensook et al., 2013). The indigenous pig breeds have longer snout, wider head...
and longer, erect ear than crossbreed pigs. They had medium size of ear (7.9 cm). The indigenous pigs were found broad and angular body shape where about 84% of them belonged broad body type. Curls as well as straight tail could be noticed with the indigenous pigs (Subaline et al., 2010). The Kolbroek is known with short, fat and has short snout resembling. Indigenous pigs prevail in the small holder farm sectors (Website). The indigenous breeds are small with short legs than the exotic breed (Adeola et al., 2013).

**Morphological features of exotic (Large White pig) breeds**

Ramesh et al. (2009) observed that the body length of Landrace was higher than the Large White pigs, but the Large White had higher height than the Landrace pig breed. The exotic pig such like Large White inference are major in anthropic selection for size, drug administration feeding and marketing live weight and carcass (Adeola et al., 2013). Large White they are large frame and they have long middle and slight shoulder. They have longer legs. The head is fairly long face and the ears are pricked (Taylor and Roese, 2005).

**Factors affecting growth performance of Large White and Kolbroek pig breed**

**Effects of environmental factors**

Lucas et al. (2000) reported that the hot temperature adversely affect the performance of pig production. Under heat stress penalties to efficient performance, production and feed conversion can be severe. During the hot season pigs reduce their feed intake, this results in reduced proportion of diurnal feed while during the cold season they increase their feed intake. The increase of nocturnal feed intake under cool temperature is not sufficient to compare with the reduction in feed intake under hot temperatures (Renaudeau et al., 2005). In the poor environment pigs increase the time spent inactive, they usually lying on the floor. According to Renaudeau et al. (2005) the lower the average of the feed intake during hot season was achieved by significant reduction of meal size while the number of meal increased slightly. The reduction in average daily gain during the hot season is directly attributable to turn down in feed intake, suggesting that average daily feed intake is a great limiting factor of the growth performance. Hicks et al. (1998) reported that cold stress has positive effects on behaviour of pigs, because it increases aggressive behaviour in nursery pigs, including tail, ear and flank biting.

**Effects of space allowance**

Increasing population density may lead to abnormal behaviour such as tail biting and increase level of aggressive behaviour like to be harmful in that the performance of the individual with social status in the group may be depressed because of stress. In the intensive production crowding reduces the amount of space per pig (Randolph et al., 1981). Stoking density increases social stress and influence pig performance. Decreasing the floor space allowance reduces daily feed intake and daily gain in pigs. The initial aggression that follows mixing of pigs has also reduced growth rate (Hyun et al., 1998). Reducing space allowance could induce decrease in growth performance of pigs. The provision for an adequate space allowance gives pig sufficient space of drinking, lying and feeding (Cho and Kim, 2011). The pigs that are kept in high stocking rate spend more time feeding and less time drinking (Vargas Vargas et al., 1987). High stocking densities have negative impact of increasing group size on growth performance. Many researchers reported that feed intake and growth rate decrease as group size increases and reported that body weight gain and gain: feed ratio of growers’ pigs decreases as the group size increases. The large group size of pigs has a negative relationship between group size, feed intake and growth rate in nursery pigs (Hyun and Ellis, 2002). It is possible that the higher level of harmful social and aggressive around the feeder in poor environment leads to lower feed intake and high level of stress which shows to adversely affected food conversion efficiency (Beattie et al., 2000).

**Effects of imbalance of feed**

In individually housed growing pigs an ad libium diet deficient in protein was found to increase general activity, walking and rooting of straw relative to the pig fed on a diet excessive in protein (Lawrence et al., 1993). If the nutrient required are not supplied in adequate amount growth performance will suffer. The sows have the ability to compensate for nutrient shortage to a certain period of time, severely inadequate intake of nutrient will be detrimental to the sow body condition and subsequent performance. If protein is higher than the expected to the feed diet usually decreases appetite and lowered daily weight gain but it has no effects on feed conversion. Lower protein poses a greater risk of amino acid imbalance and incorrect amino acid supplementation produce poor pig performance. Energy and amino acid imbalance results in improper growth poor feed efficiency.

**Effects of genetics**

Each pig breeds has its specific genetic potential for growth rate. Genetic parameter estimates on economically related traits such as feed intake, feed conversion ratio and fertility will provide the basic information that is necessary to develop selection strategies and predict expected rate of direct and correlated response to selection. The traits of the pigs.
that are positive for profitability are high growth rate, low feed conversion ratio and low fatness of the carcass. The Large White pigs are well established as a main breed in virtually all pig production countries in the world (Taylor and Roese, 2005). Depres et al. (1994) conducted the study to compare the growth performance of Large White and Local pig breeds in tropical environment and found that the growth rate of the two breeds was different with high significant. Renaudeau and Mourot (2007) found that the local breed has a lower growth performance than Large White, the average daily gain in particular was low in local breed.

Effects of sex

Females and males have a different growth performance, usually barrows pigs has a high average daily gain than the gilt (Van Hau and Gottingen, 2008). Females has a high feed intake than male animals, they also grow faster and had more carcass backfat depth and fat thickness at the gluteus medius muscle but lower lion yield (Peinoda et al., 2006), however male animals reduce the feed intake, improve the feed efficiency, less backfat, higher nitrogen retention and lean carcass. However, Eggert et al. (1996) found that the growth rate of the female pigs was slow than the male pigs.

Conclusion

Morphological measurement such as heart girth, shoulder height and body length are useful for estimating and predicting body weight in Kolbroek and Large White pigs. However, path analysis need to be done on pigs to find out which body measurement traits that is directly and indirectly affecting the body weight. Thus, can help pig farmers for selection of pigs for the breeding purposes. It is well concluded that there are factors which affect the growth performance of indigenous as well as exotic pigs.

REFERENCES


