# Breeding Practices Of Indigenous Pig Genetic Resources In Communal Production Systems Of South Africa

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## Introduction

Indigenous pigs are a major source of livelihood for many communities worldwide (Halimani *et al*., 2010), particularly the resource-poor smallholder farmers whose majority are found in developing countries. The diverse roles of indigenous pigs entail that there is need for conservation of livestock diversity to support sustainable agricultural development. The indigenous pig genetic resources in South Africa are threatened by sporadic disease outbreaks and indiscriminate crossbreeding. The severe outbreak of Classical Swine Fever three years ago led to a significant drop in the number of indigenous pigs in the Eastern Cape Province. A successful restocking programme should consider urgently involving farmers in identifying the pig breeds best suited to their resource limited environments. In order to understand the pig breeding practices, there is need to establish the selection criteria used by farmers. The productive traits like litter size and mortality rates are also important for measuring efficiency of breeding practices. The objective of this study was to determine the productivity of local pigs, breeding practices and factors used to decide on which pig breed to keep in communal production systems.

## Materials and Methods

**Data collection.** The study was conducted in communal areas in Elundini and Ngqushwa Municipalities in the Eastern Cape Province where farmers hid their pigs from culling. Data was collected from a total of 228 households from 13 villages using participatory rural appraisal (PRA) method, structured questionnaires, interviews with key informants and direct observations of pigs and production practices. The information that was collected included demographic data, livestock herd composition, litter size at birth, pre-weaning mortality, traits selected for pig breeding and functions of pigs.

**Statistical analysis.** The Generalised Linear Models procedure of SAS (2003) was used to analyze the effects of farmers' socio-economic profiles, community and production system on household pig herd size, litter size and pre-weaning mortality. Pair-wise comparisons of the least square means for litter size and pre-weaning mortality were performed using the PDIFF procedure. Analysis of variance (ANOVA) was performed for livestock species. The importance of livestock species, reasons for keeping pigs, causes of piglet mortality and selection criteria for breeding stock were ranked using Kruskal-Wallis test (NPAR1WAY procedure).

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## Results and discussion

The majority of the households (52%) were male headed but there was no relationship between gender of head of household and pig numbers. The pig genotypes kept by all the communities were the Windsnyer, Kolbroek and non-descript crossbreds. Information on parities and the performance of each specific indigenous genotype was not available due to lack of records. The mean pig herd size per household was 3.4±3.20. Pig herd size in Eastern Cape is higher than 3.3 reported in Chirumhanzu District of Zimbabwe (Chiduwa *et al*., 2008). All the respondents reared their pigs under backyard and free range or scavenging production systems. The major challenge under these production systems was feed shortages.

Litter size at birth varied amongst communities ($P<0.05$) (Table 1) and it was affected by the wealth status with the less poor farmers' pigs performing better. Less poor households can afford to buy supplementary feed and ensure better nutritional management of breeding sows. These farmers also have money to buy drugs to ensure good herd health management and avoid unnecessary losses due to diseases. The largest mean litter size of 8.72±0.60 was found in Dube community probably due to better extension advice in pig husbandry during pregnancy. In addition, most of the heads of households (96.15%) were resident on the farm and could give special care to the pregnant sows. This litter size is higher than that reported in local pig performance in Zimbabwe of 7.9 (Ndiweni and Dzama, 1995). Communal farmers in Mqokolweni cull sows after an average of 2 farrowings which leads to smaller litters since they only reach their maximum litters from the fourth to sixth parity. The average weaning period for the communities ranged between 3.84 to 7.83 months which explained the observed low productivity of one farrowing per year in all communities. There were significant differences ($P<0.05$) in pre-weaning mortality amongst communities with Dube community also having highest pre-weaning mortality of 2.17±0.34 (Table 1). Factors that contributed to piglet mortality across communities in order of importance included being crushed by older pigs in the same pen, cold due to poor housing, predation by dogs, cannibalism due to hunger, diseases and dystocia. Pig production system and education level had no effect on litter size at birth or pre-weaning mortality.

The respondents liked indigenous pigs because of their multi-functions such as consumption, income generation, savings/insurance, family pride and status, and manure for gardens in their order of importance. Traits such as heat tolerance, mothering ability, foraging ability and disease resistance were grouped as adaptive traits. There were differences in the importance of heat tolerance ($P<0.05$) in breeding among all the communities (Table 2). Gqaqala community ranked heat tolerance as a very important attribute since most farmers do not have pig houses. Selection for disease resistance is of critical importance in most of these resource-limited communities. Foraging ability was lowly ranked (Table 2) since all indigenous pigs have inherent ability to forage.

Other traits such as fast growth, litter size, meat quality and feed cost were classified as performance traits. There was no difference amongst communities for fast growth (P>0.05) and this attribute was very important (Table 2). This might mean farmers desire crossbreds which grow fast. Farmers prefer pigs that give large litter size at birth. Most communities preferred the meat of indigenous pigs because of its taste. Although communal farmers selected indigenous pigs for meat quality, they tend to be discriminated against at the commercial market because of their short carcasses, which cannot be prepared into specialized meat portions (Chimonyo *et al*., 2010).

**Table 1: Litter size and pre-weaning mortality for communal pig production systems**

| Municipality | Communities | N | Litter size | Pre-weaning mortality |
|---|---|---|---|---|
| | Katkop | 18 | $7.46\pm0.71^{bc}$ | $0.64\pm0.43^{a}$ |
| **Elundini** | St.Augustine | 24 | $7.88\pm0.62^{c}$ | $1.93\pm0.37^{bc}$ |
| | Mqokolweni | 16 | $4.85\pm0.71^{a}$ | $1.40\pm0.45^{abc}$ |
| | Gqaqala | 10 | $6.67\pm0.85^{abc}$ | $1.38\pm0.50^{abc}$ |
| | Seqhobong | 17 | $5.92\pm0.74^{ab}$ | $0.20\pm0.45^{a}$ |
| | Thinana | 39 | $7.79\pm0.59^{c}$ | $1.00\pm0.34^{ab}$ |
| **Ngqushwa** | Dube | 26 | $8.72\pm0.60^{c}$ | $2.17\pm0.34^{c}$ |
| | Tsolo | 6 | $7.50\pm1.05^{bc}$ | $0.50\pm0.58^{a}$ |
| | Mtati | 20 | $6.67\pm0.66^{abc}$ | $0.69\pm0.40^{a}$ |
| | Glenmore | 8 | $7.71\pm0.97^{bc}$ | $0.67\pm0.58^{a}$ |
| | Pikoli | 9 | $7.00\pm1.05^{abc}$ | $0.40\pm0.64^{a}$ |
| | Wooldridge | 13 | $7.75\pm0.74^{bc}$ | $0.67\pm0.48^{a}$ |
| | Bongweni | 15 | $8.55\pm0.77^{c}$ | $0.82\pm0.43^{ab}$ |

$^{abc}$ Different superscripts in the column indicates differences (P<0.05)

**Table 2: Ranks for adaptive and performance attributes selected for pig breeding by communal farmers**

| Communities | | Attributes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | Fast growth | Litter size | Meat quality | Feed cost | Disease resistance | Foraging ability | Mothering ability | Heat tolerance |
| Katkop | 18 | 3 | 6 | 1 | 2 | 4 | 7 | 5 | 8 |
| Augustine | 24 | 2 | 3 | 1 | 4 | 6 | 5 | 8 | 7 |
| Mqokolweni | 16 | 2 | 5 | 1 | 3 | 4 | 7 | 6 | 8 |
| Gqaqala | 10 | 1 | 6 | 2 | 7 | 4 | 8 | 5 | 3 |
| Seqhobong | 17 | 2 | 5 | 1 | 3 | 4 | 7 | 6 | 8 |
| Thinana | 39 | 3 | 2 | 1 | 4 | 5 | 6 | 7 | 8 |
| Bongweni | 15 | 1 | 3 | 2 | 5 | 4 | 8 | 7 | 6 |
| Dube | 26 | 2 | 3 | 1 | 5 | 4 | 8 | 6 | 7 |
| Tsolo | 6 | 1 | 2 | 3 | 4 | 7 | 5 | 6 | 8 |
| Mtati | 20 | 2 | 3 | 1 | 7 | 4 | 5 | 8 | 6 |
| Glenmore | 8 | 1 | 3 | 2 | 6 | 4 | 8 | 5 | 7 |
| Pikoli | 9 | 1 | 3 | 2 | 5 | 4 | 7 | 8 | 6 |
| Wooldridge | 13 | 1 | 2 | 3 | 6 | 5 | 7 | 4 | 8 |
| Significance | | NS | * | NS | NS | NS | NS | NS | * |

The lower the rank, the more important the attribute.
NS: not significant, * Significant difference.

## Conclusions

Indigenous pigs have the potential to produce good litter size and attain lower pre-weaning mortalities under resource-limited conditions. Communal farmers selected pig breeding stock based on their adaptive traits such as foraging ability which limits feed costs, heat tolerance, diseases and parasite resistance. Farmers also selected indigenous pigs for large litter size at birth, fast growth and meat quality. The findings of this study can be used to design an appropriate restocking program.

## References


Chiduwa, G., Chimonyo, M., Halimani, T.E., Chisambara, S.R., and Dzama, K. (2008). *Trop. Anim. Health Prod*., 37: 333-344.

Chimonyo, M., Dzama, K., and Mapiye, C. (2010). *Trop. Anim. Health Prod*., (In Press) doi: 10.1007/s11250-009-9522-5.

Halimani, T.E., Muchadeyi, F.C., Chimonyo, M., and Dzama, K. (2010). *Ecol. Econ*., doi: 10.1016/j.ecolecon.2010.01.005.

Statistical Analysis Systems. (2003). SAS Institute Inc, Cary, North Carolina, USA.