

## Reproductive Performance of Mexican Hairless Pigs Raised on Grazing Conditions

<sup>1</sup>Ma.L. Alonso-Spilsbury, <sup>2</sup>F. Clemente Lemus, <sup>1</sup>R. Ramírez-Necoechea and <sup>1</sup>Daniel Mota-Rojas  
<sup>1</sup>Ethology and Pig Production Laboratory, DPAA. Metropolitan Autonomous  
University-Xochimilco (UAM-X), Calzada del Hueso 1100, Colonia Villa Quietud, Mexico, D. F.  
04960, Mexico; <sup>2</sup>Escuela de Medicina Veterinaria y Producción Animal,  
Universidad Autónoma de Nayarit, México

---

**Abstract:** Traditionally, Mexican Hairless pigs had been discriminated and replaced by genetic improved breeds due to their poor performance; nevertheless, their importance is double since the meat improves the peasants' diet while the income received by fattening and selling the pigs creates an economy base for the communities. Currently there are interdisciplinary efforts to study this biotype, some of them are guided to raise the pigs at different confinement systems. In this study two Mexican Hairless herds kept on grazing conditions in two climates were analyzed and compared. Results show that the two herds under study had similar performances. Also, there were similarities of our results with others in variables like litter size ( $6.16 \pm 2.78$ ), piglets born alive ( $5.66 \pm 2.31$ ), stillbirths ( $5.66 \pm 2.31$ ), litter weight ( $5.99 \pm 2.45$ ) and individual weight at birth ( $1.09 \pm 0.27$ ), therefore we conclude that there is no artificial selection in this biotype. The number of farrowings per sow per year varied from 1.06 to 2.75, showing that females' reproductive performance could be improved if the sows become pregnant while still nursing, taking advantage of the lactational estrus.

**Key words:** Pigs, Mexican Hairless pig, reproductive performance, outdoor system

---

### Introduction

The Mexican native pig, and within this, the biotype Mexican Hairless, that descend from the Iberian pig, represents an endemic swine population, which is located on the Pacific and Atlantic Mexican south east coasts. The name "hairless" derives from its main characteristic, which is the absence of hair on the skin surface. The morphological characteristics of the Mexican Hairless pig (MHP) are: small size, gray-black color, long-winded head with a sub-concave side view; long face, narrow snout, medium size ears that point down and to the front, slightly covering the eye zone and short neck (Fig. 1). They also show slightly straight back, not very arched ribs and strong and long feet; their hind legs are higher than the front ones (Flores and Agráz, 1983).

Traditionally the MHP has been raised in backyard conditions, without veterinary advice, keeping it basically as a family saving income. Today this breed is on verge of extinction due to the continuous introduction of improved breeds (FAO, 1994; Benitez, 2001 and Lemus *et al.*, 2001). Although its reproductive performance has been studied, these studies have been basically indoor observations (Castro, 1981; Rojas, 1994; Tello and Cisneros, 1990) and little is known about the reproductive behavior of this Creole pig in grazing conditions (Alonso-Spilsbury and Mayagoitia, 1998 and Alonso-Spilsbury *et al.*, 1998ab).

Due to the lack of sanitary and technique advice in the pig family farms in Mexico, reproductive indicators in this biotype are not flattering. Animals in this condition produce small litters, with low weight at birth, slow growth rates which in turn, affect their fattening performance; they have low carcass performance, and high zoonosis risk (Castro, 1981; Rojas, 1994 and Moles *et al.*, 2000) as compared to the genetically improved white breeds in commercial farms. In fact, the rustic, marginal, rural and suburban pig farming with the use of creole pigs is a way of production characterized by a low scale activity, basically of subsistence (Cuarón, 1987; Losada *et al.*, 1997; Ramirez *et al.*, 1998; Becerril *et al.*, 2000 and Mota *et al.*, 2002a). Rustic pig farming is handled by old men, women, and children, therefore it is known as familiar pig farming (Fickers, 1991). Producers that are dedicated to this kind of husbandry have from one fattening pig to several sows. The genetic quality of these animals is low, although the rusticity and adaptability to environment lets them produce meat with a minimum of nutrients; they are fed with kitchen wastes, grains as corn, wheat derivatives, alfalfa, or grazing (Castillo, 1988; Conejo and Mejorada, 1990 and Losada *et al.*, 1995). Pigs in this system show low productive performance (Flores, 1970) due to the lack of official extensionism and support (Ramírez, 1997), as well as adequate marketing routes (Fickers, 1991 and Conejo and Ortega, 1995).

Backyard husbandry must be considered a peculiar productive stratum within the context of national pig farming. It must not disappear, neither be ignored, therefore it has to be studied deeper to know better its productivity and limitations (Suárez, 1995 and Ramírez and Mota, 2000) before it is too late and creole pigs get extinguished (Lemus *et al.*, 2001).

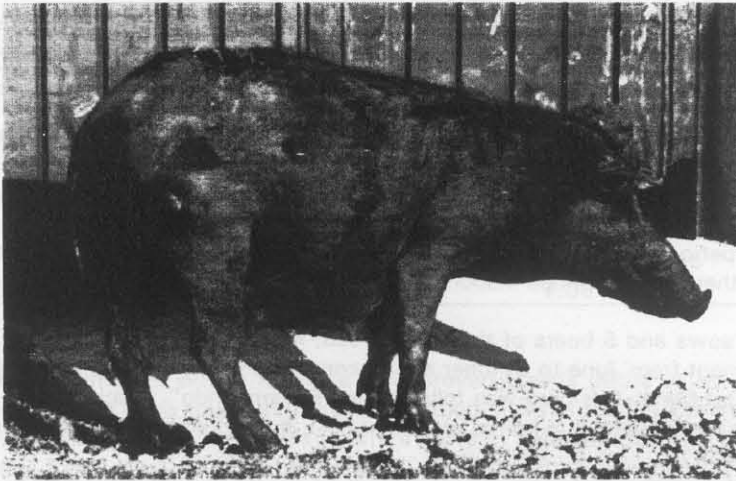


Fig. 1: A typical Mexican Hairless sow



Fig. 2: Mexican Hairless pigs raised on grazing conditions. Animals would graze for a period of 6 hours a day



Fig. 3: A breeding of a lactating sow taking place in the forest

The goal of this study was to evaluate and compare the reproductive performance of two Mexican Hairless pig herds on grazing conditions.

## Materials and Methods

A herd of 20 Mexican Hairless sows (Herd A) was observed during a period of 10 months, at the facilities of the Faculty of Veterinary Medicine at the National Autonomous University of Mexico (UNAM) in a 130 hectares of oak forest located in "Chapa de Mota", State of Mexico. This region had a moderate sub humid climate C (w) (w), a pluvial precipitation of 600 to 800 annual mm and annual temperature from 12 to 16° C.

Animals would graze for a period of 6 hours a day (Fig. 2). Growing males were not castrated. Once the animals were retired from grazing, they were confined indoors. All the pigs received a daily supplement consisting of 1 kg of a balanced diet.

Herd B was formed by 35 sows and 5 boars of the same breed, Mexican Hairless, kept under grazing conditions with 1 kg/day feed supplement from June to October and at controlled feed pens and native grass during the rainy season and seeding time (Oct-May). This herd was followed at "El Tamarindo", Municipality of Rosamorada, in the State of Nayarit, the region had a warm sub-humid weather (AW), spring raining and annual mean temperature of 26° C (Flores and Pineda, 1997).

Arithmetic means, standard deviation and ranges were obtained from the reproductive performance for both herds under study. A statistical analysis was done using the Minimum Quadratic Means comparing both herds (SAS, 1987).

## Results and Discussion

The reproductive performance of each herd is shown in Tables 1 and 2. The average for both herds was estimated (Table 3), and compared with other researchers results.

Results showed that both studies had similar performances, differences were found in pregnancy span being 1 day longer in herd B ( $113.68 \pm 1.35$  Vs.  $112.13 \pm 2.58$ ,  $p < 0.02$ ). This result agrees with others (Rico *et al.*, 1999), who had find the same figure in creole sows in Cuba ( $113.4 \pm 1.7$ ).

Average born alive piglets per farrowing in the two herds of this study are identical. Both are similar to that reported for creole pigs in tropics. Diéguez *et al.* (1997) found 5.41 piglets per litter.

The number of farrowings per sow per year varied from 1.06 to 2.75. It is remarkable that one fourth of the population studied exhibited lactational estrus (Alonso-Spilsbury and Mayagoitia, 1998). Indicating that even though this native pig had low prolificity, their productivity can be improved if the sow becomes pregnant while nursing

Table 1: Mexican Hairless sow reproductive performance in temperate climate (herd A)

Reproductive Performance	Number	X $\pm$ s. d.	Range
Pregnancy duration (days)	8	112.13 $\pm$ 2.58	108-116
Litter size	41	6.10 $\pm$ 2.41	2-10
Litter weight at birth (kg)	21	6.06 $\pm$ 2.01	2.3 $\pm$ 10.5
Piglets born alive	41	5.61 $\pm$ 2.28	1-10
Individual weight at birth (kg)	21	1.15 $\pm$ 0.27	0.84-1.76
Stillbirths	41	0.49 $\pm$ 0.93	0-3
Interval between farrowings (days)	24	181 $\pm$ 42.82	132.6-344.1
Farrowings per sow per year	24	2.09 $\pm$ 0.37	1.06-2.75

S.D = Standard deviation.

Table 2: Mexican Hairless sow reproductive performance in warm sub-humid climate (herd B)

Reproductive Performance	Number	X $\pm$ s. d.	Range
Pregnancy duration (days)	31	113.68 $\pm$ 1.35	110-117
Litter size	35	6.23 $\pm$ 3.19	1-18
Litter weight at birth (kg)	32	5.95 $\pm$ 2.73	1.17-12.3
Piglets born alive	35	5.71 $\pm$ 2.38	1-12
Individual weight at birth (kg)	32	1.05 $\pm$ 0.26	0.58-1.54
Stillbirths	35	0.51 $\pm$ 1.92	0-11
Interval between farrowings (days)	14	177.07 $\pm$ 26.3	153-249
Farrowings per sow per year	14	2.10 $\pm$ 0.27	1.47-2.39

S.D. = Standard deviation.

Table 3: Mexican Hairless sow reproductive performance under grazing systems

Reproductive Performance	Number	X $\pm$ s. d.	Range
Pregnancy duration (days)	39	113.36 $\pm$ 1.75	108.23-117
Litter size	76	6.16 $\pm$ 2.78	1-18
Litter weight at birth (kg)	53	5.99 $\pm$ 2.45	1.17-12.3
Piglets born alive	76	5.66 $\pm$ 2.31	1-12
Individual weight at birth (kg)	59	1.09 $\pm$ 0.27	0.58-1.54
Stillbirths	76	0.50 $\pm$ 1.46	0-11
Interval between farrowings (days)	38	179.9 $\pm$ 37.25	132-344
Farrowings per sow per year	38	2.09 $\pm$ 0.33	1.06-2.75

S.D. = Standard deviation.

(Fig. 3) thus, obtaining parameters similar to those of improved breeds (Mota *et al.*, 2002b). Similar results in lactational estrus induction had been found in grouped lactating sows in the Pig Family Pen System by Stolba *et al.* (1990) and in forestry conditions with domestic white sows in Sweden (Jensen, 1986).

The following productive traits: litter size, live born piglets, stillbirths, litter weight, and individual weight at birth, were similar to other research studies of MHP in different raising conditions (*e. g.* Castro, 1981; Cenobio, 1993; Rojas, 1994). These allow us to conclude that no artificial selection has been used in this biotype. Also, weather did not affect the herds' performance.

### Acknowledgments

The present study was partially sponsored by CONACyT (National Council of Science & Technology, Mexico; Project number 4213P-B9607). Authors wish to thank doctors J. L. Dávalos, V. M. Casas Pérez, and F. Espinosa from FMVZ-UNAM, for the facilities provided to monitor herd A.

### References

- Alonso-Spilsbury M. and L. Mayagoitia, 1998. Maternal behaviour of the Mexican Hairless Pig (Pelón Mexicano) under agro-forestry conditions. Proc. 32<sup>nd</sup> Congress of the International Society for Applied Ethology. I. Veissier and A. Boissy (eds.). Cleremont-Ferrand, France, pp: 208.
- Alonso-Spilsbury, M., R. Ramírez, D. Mota and L. Mayagoitia, 1998a. Ethological observations and productivity of the Mexican Hairless Pig (Pelón Mexicano) under agro-forestry conditions. 15<sup>th</sup> International Pig Veterinary Society Congress Proc. Birmingham, England. pp: 5.
- Alonso-Spilsbury, M. Ramírez N. R. and R.D. Mota, 1998b. Estro lactacional de la cerda Pelón Mexicano mantenida en condiciones agro-silvo-pastoriles. *Memorias XXXIII Congreso AMVEC*. G. Iglesias S. y M. Trujano C. (eds.). 12 al 16 de Agosto. Guanajuato, Gto. pp: 136-137.
- Becerril, H. M., R.D. Mota, S.M. Alonso, N.R. Ramírez, J.M. Berruecos, N.E. Dávalos, M.R.D. Méndez and L.M.S. Rubio, 2000. Production costs of Mexican hairless pigs raised in semi - intensive conditions. 16<sup>th</sup> International Pig Veterinary Society Congress Proc. Melbourne, Australia. 17<sup>th</sup>-20<sup>th</sup> September, pp: 190.
- Benitez, O. W., 2001. Los cerdos criollos en América Latina. In: *Los Cerdos Locales en los Sistemas Tradicionales de Producción*. Italia: FAO., pp: 13-35.
- Castillo, J., 1988. El cerdo de traspatio. *Tecnología Avípecuaria en Latinoamérica*, 1:32-35.
- Castro, G. E., 1981. Importancia que Ejercen Algunos Factores Ambientales y el Efecto del Semental sobre el Tamaño y Peso de la Camada al Nacimiento y al Destete en el Cerdo Pelón Mexicano. Tesis de Lic. MVZ, FMVZ, UNAM. México, pp: 47.
- Cenobio, S.L., 1993. Evaluación del Comportamiento Reproductivo de un Lote de Cerdas Pelón Mexicano en la Etapa de Lactancia en el Altiplano. Tesis de Licenciatura, Facultad de Medicina Veterinaria y Zootecnia. UNAM, México.
- Conejo, J.J. and A. Mejorada, 1990. Dietas utilizadas en la alimentación del cerdo de traspatio en tres comunidades de Tarímbaro, Michoacán. *Memorias del XXV Congreso Nacional AMVEC*. México, pp: 244-245.
- Conejo, J.J. and R. Ortega, 1995. Problemas de la porcicultura rural de traspatio en los países en desarrollo. En: Kato L. (ed.). *La Producción Porcícola en México: Contribución al Desarrollo de una Visión Integral*. Univ. Autónoma Metropolitana-Azcapotzalco. Univ. Michoacana San Nicolás de Hidalgo. México. pp:197-223.
- Cuarón, I.J.A., 1987. Desarrollo de esquemas tecnológicos para la porcicultura rural familiar. *Síntesis Porcina*, 6:41-45.
- Diéguez, F.J., T. Arias, I. Santana and Y. del Toro, 1997. Comportamiento experimental del cerdo criollo de Cuba. *Anaporc*, 170:116-129.
- FAO., 1994. *Boletín de Información sobre Recursos Genéticos Animales*. Italia: FAO-UNEP.

- Ficker, A. M., 1991. Pig farming in rural areas of Gabon. *Word Review Animal Zootechnie*, 1:59-63.
- Flores, J.A., 1970. Síntesis histórica y breve análisis de la especie porcina en la República Mexicana. En: Hoescht (ed.). *El Libro Azul*. México, D. F. pp: 1-10.
- Flores, M.J. and G.A. Agráz, 1983. *Ganado Porcino*. Limusa. México, D. F.
- Flores, S.F. and G.J. Pineda, 1997. *Nayarit 20 Municipios*. 1ª ed. SEP-CONAFE. Tepic, Nay. pp: 73-99.
- Jensen, P., 1986. Observations on the maternal behaviour of free-ranging domestic pigs. *Appl. Anim. Behav. Sci.*, 16:131-142.
- Lemus-Flores, C., R.Ulloa-Arvizu, M.Ramos-Kuri, F.J. Estrada and R.A. Alonso, 2001. Genetic analysis of Mexican hairless pig populations. *J. Anim. Sci.*, 79:3021-3026.
- Losada, H., M. Neale, J.Vieyra, R.Soriano, J.Rivera, J.Cortés and D. Grande, 1995. The potencial of traditional systems of pig production in the temperate region of Xochimilco. *Livestock Research for Rural Development*, 7: <http://www.cipav.org.co/lrrd/lrrd7/1/4.htm>.
- Losada, H., R. Pealing, J. Cortés and J. Vieyra, 1997. The keeping of poultry and pigs in the backyards of the urbanised areas of Iztapalapa (east of Mexico city) as a proposal for sustainable production. *Livestock Research for Rural Development*, 9:62-68.
- Moles, C.L.P., P.M. Cisneros, M.Alonso-Spilsbury, R.D. Mota, G.S. Casas, M.I. León, B.J. Valencia, N.R. Ramírez and B.J. Torres, 2000. Presence of antibodies against *Leptospira* in the hairless Mexican pig. 16th. International Pig Veterinary Society Congress Proc. Melbourne, Australia. 17th-20th September, pp: 156.
- Mota, R.D., R.Ramírez-Necoechea, M.Alonso-Spilsbury and C.A. García, 2002a. Evaluation of the reproductive performance at rustic swine farms located in Ayotzingo state of Mexico. *Livestock Research for Rural Development* 1(14): <http://www.cipav.org.co/lrrd/lrrd14/1/mota141.htm>.
- Mota, R.D., M.Alonso-Spilsbury, N.L. Mayagoitia, O.M.E. Trujillo, M.J. Valencia and N.R. Ramírez, 2002b. Lactational estrus in the Hairless Mexican sow. *Anim. Repr. Sci.*, 72:115-224.
- Ramírez, N.R., 1997. Perspectivas de la producción porcina en América Latina. *Memorias del VII Congreso Latinoamericano de Veterinarios Especialistas en Cerdos*. Río Cuarto, Córdoba, Argentina. pp:113-121.
- Ramírez, N.R., R.D. Mota and M. Alonso-Spilsbury, 1998. Módulo básico de porcicultura artesanal. *Memorias del XVI Congreso Panamericano de Ciencias Veterinarias*. Santa Cruz de la Sierra, Bolivia. pp: 322.
- Ramírez, N.R. and R.D. Mota, 2000. La porcicultura en el D. F. y área conurbada. *Foro de participación ciudadana: la ganadería y el desarrollo rural integral en México, opciones para el cambio en el subsector pecuario*. UAM-X. Octubre. 8 pp. (Unpublished).
- Rico, C., M. Mora and R. Roque, 1999. Indicadores reproductivos de cerdas del rebaño genético criollo en Cuba: primeros resultados. *Revista de la Facultad de Ciencias Veterinarias*, 40:195-200.
- Rojas, C., 1994. Comparación del Comportamiento Productivo Durante la Lactancia entre cerdos de Raza Pelón Mexicano e Híbridos de Yorkshire con Pelón Mexicano en el Altiplano. Tesis de Lic. MVZ, FMVZ, UNAM. México, pp: 29
- SAS/STAT® 1987. *User 's Guide for Personal Computers*. Version 6 Ed. SAS Institute Inc. Cary, NC.
- Stolba, A., R. Henderson and B. Wechsler, 1990. The influence of different social and physical environments on the incidence of lactational oestrus in sows. *Appl Anim Behav Sci.*, 27:269-276.
- Suárez, B., 1995. La porcicultura de traspatio y su potencialidad. En: Kato L (ed.). *La Producción Porcícola en México: Contribución al Desarrollo de una Visión Integral*. Univ. Autónoma Metropolitana-Azcapotzalco. Univ. Michoacana San Nicolás Hidalgo. México, pp: 171-195.
- Tello, R.A. and G.A.A. Cisneros, 1990. Evaluación del Comportamiento Alimenticio y Reproductivo del Cerdo Pelón Mexicano en Estabulación. Tesis de Lic. MVZ, Univ. Autónoma de Nayarit, pp:32.