

Question to EURCAW-Pigs: Adulthood of pigs

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Question

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EURCAW-Pigs received the following questions from a Ministry of one of the Member States:

- Is there scientific knowledge on when a pig can be considered as adult?
- How can adulthood be defined in castrated and ovariectomised pigs?

Answers

Several EURCAW-Pigs experts contributed to the response below. The EURCAW-Pigs secretariat did the final editing, and may be contacted for queries: info.pigs@eurcaw.eu.

In short, the answers are:

- From a biological point of view, maturity is related to the first ovulation or ejaculation.
- Maturity usually starts at approximately 4-5 months already from a body weight of approximately 60 kg onwards and is affected by genetic, management and environmental factors.
- Behavioural and physiological changes related to maturation are the growth of the secondary genitals in both sexes, swelling of the vulva and performing of sexual behaviour, e.g. mounting by boars and toleration of boar's mounting by sows.
- Castrates and ovariectomised pigs do not ejaculate/ovulate, so biologically they will never mature. In comparison to intact males / females under production, they may be considered as mature with a body weight from 60 to 120 kg.

Background

From a biological point of view, maturity of pigs is linked to the first occurrence of ovulation or ejaculation. Depending on breed, maturity in pigs usually appears after the highest increase of growth that peaks at an age of 4-5 months (Reiland, 1978) which corresponds to a weight of approximately 60 kg (Reiland, 1978). However, growth, also of genital organs, continues thereafter, and, thus, weight might be only a proxy for estimating maturity. The reach of sexual maturity slightly differs between males and females. Living sperms have been found in ejaculates of males at around an age of 5 months (Reiland, 1978), thus, maturity can be reached at this time. The time range of reaching maturity in males varies from earliest the 3rd month up to the 6th month of life (Comberg et al, 1978; Hoy, 2009). Females usually become mature with their first heat which is at the age of around five to six months (Reiland, 1978), ranging from the 4th to the 7th month of life (Comberg et al., 1978; Hoy, 2009). It is important to notice that these figures are only proxies, are based on elder studies, and that maturation can show high inter-individual variation. Furthermore, average maturation can vary between breeds and specific environmental and management factors (Hörügel and Prange, 2004).

For gilts, Evan and Doherty (2001) reviewed the ages at maturation in five different breeds, varying between 97 days (Meishan) and 235 days (Duroc) on average. Furthermore, gilts' developmental conditions affect timing of maturation. Small body weights at birth and lower

growth rates delay maturation due to lower follicle growth and ovarian follicle populations (Kummer et al., 2009, Miller et al., 2011, van Wettere et al., 2011, Almeida et al., 2017 - all reviewed by Knox, 2019). With regard to body composition, maturation occurs only after the attainment of a minimum level of leanness, fatness or the ratio of fat to lean (Cunningham et al., 1974, den Hartog and van Kempen, 1980, Kirkwood and Aherne 1985 - all reviewed by Evans and O'Doherty, 2001). Regarding management factors, nutrition of gilts during rearing affects time of first oestrus. In particular, a restrictive energy and feed intake is related to a delayed maturation. Furthermore, the onset of maturation is affected by whether and at which age gilts have contact with mature boars (e.g. Brooks and Smith, 1980). In addition, environmental factors affect the onset of maturation such as heat stress, space allowance and air quality (reviewed by Evan and Doherty, 2001).

Whereas much is known about the effects on onset of maturation in gilts, little is known about the factors affecting maturation of male pigs. Most investigations on maturity of male pigs are focusing on hormonal changes during puberty, (e.g. FlorCruz and Lapwood, 1978, Allrich et al., 1983, Trudeau et al., 1992), or selection criteria for young boars intended for artificial insemination, (e.g. Schulze et al., 2014). For mature breeding boars, more factors of fertility are established (see Savić et. al., 2017).

Maturity is accompanied by certain physiological and behavioural changes in pigs. Most obvious signs are the growth of the secondary genitals in both sexes (Comberg et al., 1978). In addition, pigs show sexual behaviour with starting maturity such as mounting behaviour in boars (Hoy, 2009). Sows' heat is indicated by swelling of the vulva that also becomes more intense reddish (Hoy, 2009). Furthermore, when in heat, sows tolerate being mounted by a boar enabling copulation (Hoy, 2009). During heat, body temperature of sows is increased and often sows in heat are seeking for cooling opportunities (Mayer et al., 2006). In some breeds, both boars and castrated male pigs tend to have less subcutaneous fat compared to sows (Walstra, 1980). An interesting change with maturity is that mastication/chewing activity is reduced (Herring, 1977), which may have implications for the feeding and or general biting incidents.

Castrated male and ovariectomised female pigs do not ejaculate or ovulate. Thus, biologically they will never mature. However, despite their missing sexual maturity they develop similar to intact male or female pigs. From a practical point of view, gilts enter breeding herd after maturity (first oestrus) and with their first mating, which occurs in the second or third oestrus at a body weight of at least 115 to 120 kg (Aherne and Williams, 1992, Soede et al., 2011). Young boars are selected for breeding at a body weight of 100 kg, i.e. likely a certain time after maturity (Robinson and Buhr, 2005). Thus, castrates and ovariectomised pigs can be considered as "mature" within a quite broad range of body weight from 60 to 120 kg, depending on the individual development, breed, rearing conditions etc.

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