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3 Characteristics of repeat-breeding female pigs on southern EU commercial farms

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9 **Introduction**

10 A repeat-breeding (RB) occurrence increases non-productive days of female pigs
11 (NPD), and consequently decreases herd productivity. However, characteristics of RB
12 female pigs are not well defined or studied in swine. Also, few studies have compared
13 lifetime reproductive performance between RB and non-RB female pigs. Our objectives
14 were 1) to define and characterize RB occurrences using data from commercial farms in
15 southern EU, 2) to examine factors associated with the RB risk, and 3) to assess the
16 reproductive performances of the RB or non-RB females.

17 **Materials and Methods**

18 The data included 121,103 lifetime records and 645,103 service records of
19 female pigs on 125 farms between 2008 and 2013. Applying the definition of RB in
20 cattle to female pigs, an RB female pig was defined as a pig that had had three or more
21 returns, or a pig that was culled due to reproductive failure after its second return within
22 the same parity. The herds were classified into high-, intermediate- and low-performing
23 herds on the basis of the upper and lower 10th percentile of the herd means of
24 annualized lifetime pigs weaned per sow. Multilevel generalized linear models with

25 random intercept were applied to the data. A chi-square test was also used to compare
26 the frequency distributions (%).

27 **Results**

28 Mean RB risks per service for female pigs (\pm SEM) was $0.5 \pm 0.01\%$. Risks of
29 RB in parities 0, 1 and 2 female pigs were 0.8, 0.5 and 0.4%, respectively, whereas risks
30 of RB in parity 3 or later were only 0.2-0.3%. The RB female pigs had more regular
31 returns, of 18-24 days post service, than non-RB female pigs ($P < 0.05$). Of 3,497 first
32 re-service records of RB female pigs, 47% had regular returns. They also had increased
33 lifetime NPD, ranging from 171 to 206 days, compared with only 78-84 days for non-
34 RB females. Risk factors for RB pigs were low parity (i.e., 0 and 1), summer servicing,
35 farrowing fewer number of pigs born alive and being in low-performing herds.
36 However, gilt age at-first-mating ($P=0.13$), nor number of stillborn piglets ($P=0.64$), nor
37 herd size for females ($P = 0.08$) were associated with RB. For instance, risk of RB in
38 gilts and in summer were 1.5 and 0.8%, respectively, compared to only 0.3 and 0.6% in
39 parity 6 or more and in winter. The RB risks on high-performing and low-performing
40 farms were 0.2 and 2.6%, respectively. The RB females had 55.2-92.5 more lifetime
41 NPD, 1.5-3.3 lower parity at culling and 19.4-39.2 fewer lifetime pigs born alive across
42 parities than non-RB females ($P < 0.05$).

43 **Conclusion**

44 We recommended that producers, especially on low-performing farms, should
45 closely monitor the identified female pig groups at a greater risk of a having RB (2,694
46 characters).

47 Keywords: repeat-breeding; lifetime performance; herd productivity groups