

## Sažeci doktorskih disertacija – *Doctoral thesis summaries*

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### ANALIZA RASTA I PROCJENA BIOLOŠKOGA MAKSIMUMA U SVINJA

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#### SAŽETAK

Cilj ovog istraživanja bio je odrediti matematički model koji se može koristiti u opisivanju rasta domaćih životinja u cilju predviđanja optimalnoga vremena klanja, s obzirom na težinu i razvoj dijelova tijela ili tkiva, te procjena biološkoga maksimuma. Istraživanje je provedeno na 60 svinja (30 kastrata i 30 nazimica) u dobnom intervalu između 49 i 215 dana. Primjenom generalizirane logističke funkcije, opisan je prirast žive mase i pojedinih tkiva. Nazimice uključene u istraživanje dostigle su točku infleksije za oko 121 dan ( $I=70,7$  kg). Točka u kojoj počinje interval intenzivnoga porasta žive mase procjenjena je na približno 42 dana ( $T_B=17,35$  kg), a točku zasićenja rasta u prirastu tjelesne mase svinje su dostigle u dobi od 200,5 dana ( $T_C=126,74$  kg). Procjenjeni biološki maksimum za tjelesnu masu u nazimica bio je 179,79 kg. Kastrati su dostigli točku infleksije za oko 149 dana ( $I=92,2$  kg). Točka u kojoj počinje interval intenzivnoga porasta procjenjena je na približno 52 dana ( $T_B=22,93$  kg), a točku zasićenja rasta u prirastu tjelesne mase, kastrati su dostigli u dobi od 245 dana ( $T_C=164,8$  kg). Procjenjeni biološki maksimum za tjelesnu masu u kastrata bio je 233,25 kg. Mišićno tkivo nazimica dostiglo je točku infleksije ( $I=28,46$  kg) za oko 110 dana. Točka u kojoj počinje interval intenzivnoga porasta mišićnoga tkiva ( $T_B=6,06$  kg) bila je procjenjena na približno 53 dana, a točka zasićenja rasta ( $T_C=52,25$  kg) mišićnoga tkiva nazimica dostignuta je u dobi od 162 dana. Procjenjeni biološki maksimum za rast mišićnoga tkiva u nazimica bio je 75,79 kg. Točku infleksije mišićno tkivo kastrata ( $I=28,78$  kg) ostvarilo je za oko 118 dana, a točku u kojoj počinje interval intenzivnoga porasta ( $T_B=6,36$  kg) za približno 35 dana. Točka zasićenja rasta mišićnoga tkiva kastrata ( $T_C=52,51$  kg) bila je dostignuta u dobi od 202 dana. Procjenjeni biološki maksimum za rast mišićnoga tkiva u kastrata bio je 75,74 kg. Masno tkivo nazimica uključenih u istraživanje dostiglo je točku infleksije ( $I=11,71$  kg) za oko 143 dana. Procjenjeni biološki maksimum za

rast masnoga tkiva u nazimica bio je 31,1 kg. Masno tkivo kastrata dostiglo je točku infleksije ( $I=23,56$  kg) za oko 211 dana. Procjenjeni biološki maksimum za rast masnoga tkiva u kastrata bio je 62,63 kg. Rast kostiju iz trupova istraživanih nazimica dostigao je točku infleksije ( $I=4,42$  kg) za oko 99 dana. Procjenjeni biološki maksimum za rast kostiju u nazimica bio je 10,94 kg. Kosti kastrata dostigle su točku infleksije ( $I=12,35$  kg) za oko 262 dana. Procjenjeni biološki maksimum za rast kostiju u kastrata bio je 32,75 kg. Točnost predviđanja vremena za dostizanje 100 kg tjelesne mase pomoću pripadajućega modela je zadovoljavajuća.

Ključne riječi: asimetrična S-funkcija, svinje, rast, predviđanje, tjelesna masa, mišićno i masno tkivo, kosti

### GROWTH ANALYSIS AND ASSESSMENT OF PIG'S BIOLOGICAL MAXIMUM

*Doctoral thesis*

#### SUMMARY

The aim of this study was to determine a mathematical model which can be used to describe the growth of domestic animals in an attempt to predict the optimal time of slaughter/weight or the development of body parts or tissues and estimate the biological maximum. The study was conducted on 60 pigs (30 barrows and 30 gilts) in the interval between the age of 49 and 215 days. By applying the generalized logistic function, the growth of live weight and tissues were described. The observed gilts reached the inflection point in approximately 121 days ( $I = 70.7$  kg). The point at which the interval of intensive growth starts was at the age of approximately 42 days, ( $T_B=17.35$  kg) and the saturation point the pigs reached at the age of 200.5 days ( $T_C=126.74$  kg). The estimated biological maximum weight of gilts was 179.79 kg. The barrows

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reached the inflection point in approximately 149 days ( $l=92.2$  kg). The point at which the intensive interval of growth starts was estimated at the age of approximately 52 days ( $T_B=22.93$  kg), and the saturation point the barrows reached at the age of 245 days ( $T_C=164.8$  kg). The estimated biological maximum weight of barrows was 233.25 kg. Muscle tissue of gilts reached the inflection point ( $l = 28.46$  kg) in approximately 110 days. The point at which the interval of intensive growth of muscle tissue starts ( $T_B=6.06$  kg) was estimated at approximately 53 days, and the saturation point of growth ( $T_C=52.25$  kg) the muscle tissue of gilts reached at the age of 162 days. The estimated maximum biological growth of muscle tissue in gilts was 75.79 kg. The muscle tissue of barrows reached the inflection point ( $l=28.78$  kg) in approximately 118 days, the point at which the interval of intensive growth starts ( $T_B=6.36$  kg) at the age of approximately 35 days. The saturation point of muscle tissue growth in barrows ( $T_C=52.51$  kg) was reached at the age of 202 days. The estimated maximum biological growth of muscle tissue

in barrows was 75.74 kg. The fatty tissue of gilts that were observed reached the inflection point ( $l=11.71$  kg) in approximately 143 days. The estimated biological maximum of the growth of the fatty tissue of gilts was 31.1 kg. The fatty tissue of the observed barrows reached the inflection point ( $l=23.56$  kg) in approximately 211 days. The estimated biological maximum for the growth of fatty tissue of barrows was 62.63 kg. The growth of bones of the observed gilts reached the inflection point ( $l=4.42$  kg) in approximately 99 days. The estimated biological maximum for the growth of bones of the gilts was 10.94 kg. The bones of the observed barrows reached the inflection point ( $l=12.35$  kg) in approximately 262 days. The estimated biological maximum growth of bones of barrows was 32.75 kg. The accuracy of prediction of the length of period was supposed to reach 100 kg of body weight using the model is satisfactory.

Key-words: asymmetric S-function, pigs, growth, prediction, body weight, muscle tissue, fat, bones