

Effective thresholds for reporting suspicions and improve early detection of avian influenza outbreaks in layer chickens

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S1. Quantification and application of weekly ratio

This is an example using data of one of the outbreaks analysed in this study. The figure bellow (Figure S1) is an example of the way daily production is manually recorded in a Dutch layer farm.

Totaal productie tot week 44 ± 421 dooddrub 1/5

| wk. nr. | dag | aant. hennen | uitval | dagproductie | 2e soort eieren | kg. voer | ltr. water | w/v | eigew. | kg. eieren | lev. voer | |
|---------|-----|--------------|--------|--------------|-----------------|----------|------------|-----|--------|------------|-----------|---------------------------|
| 44 | Di | 22518 | 3 | 20880 | 211 | 133 | 165 | | | 171 | | verlichting |
| | Wo | 22516 | 2 | 21240 | 211 | 128 | 168 | | | 111 | | leg % 90,9 |
| | Do | 22515 | 1 | 19980 | 162 | 132 | 167 | | | | | eigewicht |
| | Ve | 22511 | 4 | 20340 | 96 | 134 | 179 | | | | | eimassa |
| | ZA | 22509 | 2 | 19800 | 160 | 137 | 193 | | | | | % 2e soort eieren |
| | Zo | 22509 | 0 | 19440 | 272 | 132 | 202 | | | | | kg. eieren |
| | MA | 22506 | 3 | 21600 | 176 | 131 | 191 | | | 200 | | voerverbr. p.d.p.d. 132,4 |
| TOTAAL | | | 15 | 143880 | 1308 | 927 | | | | | | v.c. |
| TOTAAL | | | | | | | | | | | | w/v |
| TOTAAL | | | | | | | | | | | | lichaamsgew. |
| 45 | Di | 22503 | 3 | 19800 | 140 | 130 | 190 | | | 200 | | verlichting |
| | Wo | 22499 | 4 | 21600 | 342 | 130 | 197 | | | 110 | | leg % 90,25 |
| | Do | 22498 | 1 | 18720 | 187 | 132 | 196 | | | | | eigewicht |
| | Ve | 22496 | 2 | 21240 | 310 | 135 | 205 | | | | | eimassa |
| | ZA | 22494 | 2 | 20340 | 227 | 131 | 210 | | | | | % 2e soort eieren |
| | Zo | 22488 | 6 | 19440 | 267 | 125 | 202 | | | | | kg. eieren |
| | MA | 22485 | 3 | 20880 | 253 | 119 | 190 | | | | | voerverbr. p.d.p.d. 128,8 |
| TOTAAL | | | 21 | 142020 | 1726 | 962 | | | | | | v.c. |
| TOTAAL | | | | | | | | | | | | w/v |
| TOTAAL | | | | | | | | | | | | lichaamsgew. |
| 46 | Di | 22471 | 14 | 19980 | 292 | 111 | 182 | | | 11 | | verlichting |
| | Wo | 22456 | 15 | 19800 | 367 | 114 | 183 | | | 11 | | leg % 81,6 |
| | Do | 22444 | 12 | 18000 | 224 | 110 | 187 | | | | | eigewicht |
| | Ve | 22421 | 23 | 18000 | 299 | 106 | 199 | | | | | eimassa |
| | ZA | 22391 | 30 | 17561 | 288 | 105 | 204 | | | | | % 2e soort eieren |
| | Zo | 22363 | 28 | 16200 | 319 | 112 | 208 | | | | | kg. eieren |
| | MA | 22330 | 33 | 18540 | 491 | 113 | 213 | | | | | voerverbr. p.d.p.d. 110 |
| TOTAAL | | | 155 | 128081 | 2250 | 771 | | | | | | v.c. |
| TOTAAL | | | | | | | | | | | | w/v |
| TOTAAL | | | | | | | | | | | | lichaamsgew. |
| 47 | Di | 22294 | 36 | 16920 | 326 | 121 | 220 | | | 11 | | verlichting |
| | Wo | 22282 | 12 | 16920 | 287 | | | | | | | leg % |
| | Do | 22273 | 9 | 16020 | 200 | | | | | | | eigewicht |
| | | | | | | | | | | | | eimassa |
| | | | | | | | | | | | | % 2e soort eieren |

Figure S1. Picture of production logbook in Dutch layer farm.

The total number of chickens dead in week 44 were 15 (see figure, row "Totaal", column 4).

The average mortality per day for week 44: $15/7 = 2.1$. this value is used to calculate the daily mortality ratio for week 45 as shown in Table S1

Table S1. Calculation of daily mortality ratio for week 45

| Week 45 | Day | Mortality | Ratio | |
|---------|-----|-----------|-------------|-----|
| | Tue | 3 | $3 / 2.1 =$ | 1.4 |
| | Wed | 4 | $4 / 2.1 =$ | 1.9 |
| | Thu | 1 | $1 / 2.1 =$ | 0.5 |
| | Fri | 2 | $2 / 2.1 =$ | 1.0 |
| | Sat | 2 | $2 / 2.1 =$ | 1.0 |
| | Sun | 6 | $6 / 2.1 =$ | 2.9 |
| | Mon | 3 | $3 / 2.1 =$ | 1.4 |

The average mortality per day for week 45: $21/7 = 3$. This value is then used to calculate the daily mortality ratio for week 46 as shown in table S2.

Table S2. Calculation of the daily mortality ratio for week 46.

| Week 46 | Day | Mortality | Ratio | |
|---------|-----|-----------|------------|------|
| | Tue | 14 | $14 / 3 =$ | 4.7 |
| | Wed | 15 | $15 / 3 =$ | 5.0 |
| | Thu | 12 | $12 / 3 =$ | 4.0 |
| | Fri | 23 | $23 / 3 =$ | 7.7 |
| | Sat | 30 | $30 / 3 =$ | 10.0 |
| | Sun | 28 | $28 / 3 =$ | 9.3 |
| | Mon | 33 | $33 / 3 =$ | 11.0 |

This week the outbreak is detected on Tuesday since the mortality ratio > 2.9 for two consecutive days.