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| Phase 1 Experiment | | | Phase 2 Experiment | | | | | | |
| v | *rb* | Residual DF of the Bw Ani stratum | *nRuns* | *nTags* | Animal DF in the Bw Runs stratum | Within Runs stratum | | | |
| Tag DF in the Bw Ani stratum | Residual DF of the Bw Ani stratum | Tag ⊥ Treatment | *ETreatment* |
| 2 | 2 | 2 | 2 | 4 | 0 | 1 | 1 | Yes | 1 |
| 3 | 4 | 3 | 1 | 1 | 2 | No (1/9) | 8/9 |
| 4 | 6 | 4 | 1 | 1 | 4 | Yes | 1 |
| 5 | 8 | 5 | 2 | 1 | 5 | No (1/25) | 24/25 |
| 6 | 10 | 6 | 2 | 1 | 7 | Yes | 1 |
| 7 | 12 | 7 | 3 | 1 | 8 | No (1/49) | 48/49 |
| 8 | 14 | 8 | 3 | 1 | 10 | Yes | 1 |
| 9 | 16 | 9 | 4 | 1 | 11 | No (1/81) | 80/81 |
| 10 | 18 | 10 | 4 | 1 | 13 | Yes | 1 |

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| Phase 1 Experiment | | | Phase 2 Experiment | | | | | | |
| v | *rb* | Residual DF of the Bw Ani stratum | *nRuns* | *nTags* | Animal DF in the Bw Runs stratum | Within Runs stratum | | | |
| Tag DF in the Bw Ani stratum | Residual DF of the Bw Ani stratum | Tag ⊥ Treatment | *ETreatment* |
| 2 | 4 | 6 | 2 | 4 | 0 | 3 | 3 | Yes | 1 |
| 6 | 10 | 3 | 1 | 3 | 6 | No (1/9) | 8/9 |
| 8 | 14 | 4 | 1 | 3 | 10 | Yes | 1 |
| 10 | 18 | 5 | 2 | 3 | 13 | No (1/25) | 24/25 |

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| **Phase 1 Design** | | | **Phase 2 Design** | | | | | | | | |
| v | *rb* | Between Animals Residual DF | *nRuns* | *nTags* | *Bw Runs stratum* | | *Between Animals within Runs stratum* | | | | |
| Animal DF | Trt DF | Tag DF | Residual DF | Tag ⊥ Trt | *Treatment efficiency factors* | |
| *ei* | *E* |
| 3 | 2 | 3 | 3 | 4 | 1 | 1 | 1 | 1 | Yes | 1, 3/4 | 6/7 |
| 4 | 9 | 6 | 2 | 2 | 1 | 6 | Yes | 15/16(2) | 15/16 |
| 6 | 15 | 9 | 4 | 2 | 1 | 10 | Yes | 23/24, 7/8 | 0.9148 |
| 8 | 21 | 12 | 5 | 2 | 1 | 15 | Yes | 15/16 (2) | 15/16 |
| 10 | 27 | 15 | 7 | 2 | 1 | 19 | Yes | 19/20, 9/10 | 0.9243 |

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| Phase 1 Experiment | | | Phase 2 Experiment | | | | | | | | |
| v | *rb* | Residual DF of the Bw Ani stratum | *nRuns* | *nTags* | Bw Runs stratum | | Within Runs stratum | | | | |
| Animal DF | Trt DF | Tag DF in the Bw Ani stratum | Residual DF of the Bw Ani stratum | Tag ⊥ Treatment | *eTreatment* | *ETreatment* |
| 3 | 4 | 9 | 3 | 8 | 1 | 1 | 3 | 5 | Yes | 1, 15/16 | 30/31 |
| 8 | 21 | 6 | 2 | 2 | 3 | 16 | Yes | 63/64 (2) | 63/64 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 4 | 2 | 4 | 16 | 4 | 4 | 1 | No (1DF) | 2 | 3 | Yes | 1 | 1 |
| 3 | 8 | 24 | 6 | 2 | No (1DF) | 5 | 7 | No (1/9) | 1(2), 8/9 | 24/25 |
| 4 | 12 | 32 | 8 | 3 | No (1DF) | 8 | 11 | Yes | 1 | 1 |
| 5 | 16 | 40 | 10 | 4 | No (1DF) | 11 | 15 | No (1/25) | 1(2), 24/25 | 72/73 |
| 6 | 20 | 48 | 12 | 5 | No (1DF) | 14 | 19 | Yes | 1 | 1 |
| 7 | 24 | 56 | 14 | 6 | No (1DF) | 17 | 23 | No (1/49) | 1(2), 48/49 | 0.9931 |
| 8 | 28 | 64 | 16 | 7 | No (1DF) | 20 | 27 | Yes | 1 | 1 |
| 9 | 32 | 72 | 18 | 8 | No (1DF) | 23 | 31 | No (1/81) | 1(2), 80/81 | 0.9959 |
| 10 | 36 | 80 | 20 | 9 | No (1DF) | 26 | 35 | Yes | 1 | 1 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 4 | 2 | 4 | 16 | 2 | 8 | 0 | No (3DF) | 2 | 2 | No (1/2) | 1,1/2(2) | 3/5 |
| 3 | 8 | 24 | 3 | 1 | No (3DF) | 4 | 5 | No (1/9) | 8/9 (3) | 8/9 |
| 4 | 12 | 32 | 4 | 1 | No (3DF) | 8 | 9 | Yes | 1 | 1 |
| 5 | 16 | 40 | 5 | 2 | No (3DF) | 11 | 13 | No (1/25) | 24/25(3) | 24/25 |
| 6 | 20 | 48 | 6 | 2 | No (3DF) | 15 | 17 | No (1/18) | 1, 17/18(2) | 51/53 |
| 7 | 24 | 56 | 7 | 3 | No (3DF) | 18 | 21 | No (1/49) | 48/49(3) | 48/49 |
| 8 | 28 | 64 | 8 | 3 | No (3DF) | 22 | 25 | Yes | 1 | 1 |
| 9 | 32 | 72 | 9 | 4 | No (3DF) | 25 | 29 | No (1/81) | 80/81(3) | 80/81 |
| 10 | 36 | 80 | 10 | 4 | No (3DF) | 29 | 33 | No (1/50) | 1, 49/50(2) | 0.9866 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 5 | 2 | 5 | 20 | 5 | 4 | 2 (2 Trt) | No (1 DF) | 2 | 2 | Yes | 1(2), 7/8, 5/8 | 0.8434 |
| 4 | 15 | 40 | 10 | 4 (4 Trt) | No (1 DF) | 10 | 10 | Yes | 15/16(4) | 15/16 |
| 6 | 25 | 60 | 15 | 7 (4 Trt) | No (1 DF) | 17 | 20 | Yes | 23/24(2), 11/12 5/6 | 0.9137 |
| 8 | 35 | 80 | 20 | 9 (4 Trt) | No (1 DF) | 25 | 30 | Yes | 15/16(4) | 15/16 |
| 10 | 45 | 100 | 25 | 12 (4 Trt) | No (1 DF) | 32 | 40 | Yes | 19/20(2), 37/40, 7/8 | 0.9240 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 5 | 4 | 15 | 40 | 5 | 8 | 2 (2 Trt) | No (3 DF) | 10 | 10 | Yes | 1(2), 15/16(2) | 30/31 |
| 8 | 35 | 80 | 10 | 4 (4 Trt) | No (3 DF) | 28 | 28 | Yes | 0.994 (2), 0.959(2) | 0.9763 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 6 | 2 | 6 | 24 | 6 | 4 | 2 (2 Trt) | No (1 DF) | 3 | 3 | Yes | 1(3), 3/4(2) | 0.8824 |
| 3 | 12 | 36 | 9 | 4 (4 Trt) | No (1 DF) | 7 | 7 | No (1/9) | 11/12(2), 8/9, 3/4(2) | 0.8370 |
| 4 | 18 | 48 | 12 | 5 (4 Trt) | No (1 DF) | 12 | 13 | Yes | 1, 15/16(2), 13/16(2) | 0.8937 |
| 5 | 24 | 60 | 15 | 7 (5 Trt) | No (1 DF) | 16 | 18 | No (1/25) | 0.953, 9/10, 0.8836, 0.8235, 4/5 | 0.8686 |
| 6 | 30 | 72 | 18 | 8 (4 Trt) | No (1 DF) | 21 | 25 | Yes | 1,  7/8 (4) | 0.8974 |
| 7 | 36 | 84 | 21 | 10 (5 Trt) | No (1 DF) | 25 | 30 | No (1/49) | 13/14, 0.9164, 6/7(2), 0.8489 | 0.8804 |
| 8 | 42 | 96 | 24 | 11 (5 Trt) | No (1 DF) | 30 | 36 | Yes | 15/16 (2), 7/8 (3) | 0.8990 |
| 9 | 48 | 108 | 27 | 13 (5 Trt) | No (1 DF) | 34 | 42 | No (1/81) | 0.9272, 11/12, 0.8872, 31/36, 0.8399 | 0.8852 |
| 10 | 54 | 120 | 30 | 14 (5 Trt) | No (1 DF) | 39 | 48 | Yes | 0.9 (5) | 0.9 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 6 | 2 | 6 | 24 | 3 | 8 | 1 (1 Trt) | No (3 DF) | 2 | 2 | No (1/3) | 1, 3/4,  2/3(3) | 0.7317 |
| 4 | 18 | 48 | 6 | 2 (2 Trt) | No (3 DF) | 13 | 13 | Yes | 1(3), 15/16(2) | 0.9740 |
| 6 | 30 | 72 | 9 | 4 (4 Trt) | No (3 DF) | 23 | 23 | No (4/81) | 0.9792,  0.9601, 0.9421 0.9375 0.9033 | 0.9438 |
| 8 | 42 | 96 | 12 | 5 (4 Trt) | No (3 DF) | 34 | 35 | Yes | 1, 63/64(2), 61/64(2) | 0.9746 |
| 10 | 54 | 120 | 15 | 7 (5 Trt) | No (3 DF) | 44 | 46 | No (4/225) | 39/40, 0.974, 0.962 19/20, 0.949 | 0.9619 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 7 | 2 | 7 | 28 | 7 | 4 | 3 (3 Trt) | No (1 DF) | 3 | 3 | Yes | 1(3), 7/8, 5/8, 1/2 | 0.7749 |
| 4 | 21 | 56 | 14 | 6 (6 Trt) | No (1 DF) | 14 | 14 | Yes | 7/8 (6) | 7/8 |
| 6 | 35 | 84 | 21 | 10 (6 Trt) | No (1 DF) | 24 | 28 | Yes | 7/8(5),  19/24 | 0.8599 |
| 8 | 49 | 112 | 28 | 13 (6 Trt) | No (1 DF) | 35 | 42 | Yes | 7/8 (6) | 7/8 |
| 10 | 63 | 140 | 35 | 17 (6 Trt) | No (1 DF) | 45 | 56 | Yes | 7/8(5), 33/40 | 0.8663 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 7 | 4 | 21 | 56 | 7 | 8 | 3 (3 Trt) | No (3 DF) | 15 | 15 | Yes | 1(3),  31/32(2), 7/8 | 0.9666 |
| 8 | 49 | 112 | 14 | 6 (6 Trt) | No (3 DF) | 40 | 40 | Yes | 63/64 (6) | 0.9844 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 8 | 2 | 8 | 32 | 8 | 4 | 3 (3 Trt) | No (1 DF) | 4 | 4 | Yes | 1(4), 3/4(2), 1/2 | 0.8077 |
| 3 | 16 | 48 | 12 | 5 (5 Trt) | No (1 DF) | 10 | 10 | No (1/9) | 1, 11/12(2), 8/9, 3/4(2), 2/3 | 0.8261 |
| 4 | 24 | 64 | 16 | 7 (7 Trt) | No (1 DF) | 16 | 16 | Yes | 0.963 (2), 0.875 (2), 0.7866 (2), 0.75 | 0.8498 |
| 5 | 32 | 80 | 20 | 9 (7 Trt) | No (1 DF) | 22 | 24 | No (1/25) | 9/10(3), 43/50, 4/5(3) | 0.8489 |
| 6 | 40 | 96 | 24 | 11 (6 Trt) | No (1 DF) | 28 | 33 | Yes | 1, 5/6(6) | 0.8537 |
| 7 | 48 | 112 | 28 | 13 (7 Trt) | No (1 DF) | 34 | 40 | No (1/49) | 6/7(6), 41/49 | 0.8542 |
| 8 | 56 | 128 | 32 | 15 (7 Trt) | No (1 DF) | 40 | 48 | Yes | 0.9192(2), 0.875, 0.8308(2), 0.8125(2) | 0.8550 |
| 9 | 64 | 144 | 36 | 17 (7 Trt) | No (1 DF) | 46 | 56 | No (1/81) | 8/9(2), 71/81 , 5/6 (3) | 0.8546 |
| 10 | 72 | 160 | 40 | 19 (7 Trt) | No (1 DF) | 52 | 64 | Yes | 0.9, 0.8854(2), 17/20 (2), 0.8146(2) | 0.8559 |

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| Phase 1 Experiment | | DF of residual in between animals stratum | Number of observation | Phase 2 Experiment | | DF of Animal in the between Runs stratum | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | | Tag orthogonal to Treatment | Treatment | |
| Treatment | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| 8 | 2 | 8 | 32 | 4 | 8 | 1 | No (3 DF) | 4 | 5 | No (3/10) | 1(4), 3/4(2), 1/2 | 0.8077 |
| 3 | 16 | 48 | 6 | 2 | No (3 DF) | 11 | 13 | No (1/9) | 1(4), 8/9(3) | 0.9492 |
| 4 | 24 | 64 | 8 | 3 | No (3 DF) | 18 | 21 | Yes | 1(7) | 1 |
| 5 | 32 | 80 | 10 | 4 | No (3 DF) | 25 | 29 | No (1/25) | 1(4), 24/25(3) | 0.9825 |
| 6 | 40 | 96 | 12 | 5 | No (3 DF) | 32 | 37 | No (1/30) | 1(4), 35/36(2), 17/18 | 0.9837 |
| 7 | 48 | 112 | 14 | 6 | No (3 DF) | 39 | 45 | No (1/49) | 1(4), 48/49(3) | 0.9912 |
| 8 | 56 | 128 | 16 | 7 | No (3 DF) | 46 | 53 | Yes | 1(7) | 1 |
| 9 | 64 | 144 | 18 | 8 | No (3 DF) | 53 | 61 | No (1/81) | 1(4), 80/81(3) | 0.9947 |
| 10 | 72 | 160 | 20 | 9 | No (3 DF) | 60 | 69 | No (3/250) | 1(4), 99/100(2),  49/50 | 0.9942 |