|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | Number of observation | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 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 |
| Treat | Block | Bio Rep | Runs | Tags | Average Eff Factor |
| Cage | Animal |
| 2 | 2 | 2 | 2 | 8 | 1 | 2 | 4 | 0 | 0 | Yes | 1 | Yes | 1 |
| 3 | 3 | 12 | 2 | 3 | 1 | 0 | No (1DF) | 1 | No(1/9) | 8/9 |
| 2 | 4 | 16 | 5 | 4 | 0 | 1 | Yes | 4 | Yes | 1 |
| 4 | 3 | 1 | 0 | Yes | 3 | Yes | 1 |
| 5 | 5 | 20 | 4 | 5 | 2 | 0 | No (1DF) | 3 | No(1/25) | 24/25 |
| 2 | 6 | 24 | 9 | 6 | 0 | 2 | Yes | 7 | Yes | 1 |
| 3 | 8 | 2 | 0 | No (1DF) | 7 | Yes | 1 |
| 6 | 5 | 2 | 0 | Yes | 5 | Yes | 1 |
| 7 | 7 | 28 | 6 | 7 | 3 | 0 | No (1DF) | 5 | No(1/49) | 48/49 |
| 2 | 8 | 32 | 13 | 8 | 0 | 3 | Yes | 10 | Yes | 1 |
| 4 | 11 | 3 | 0 | No (1DF) | 10 | Yes | 1 |
| 8 | 7 | 3 | 0 | Yes | 7 | Yes | 1 |
| 3 | 9 | 36 | 14 | 9 | 2 | 2 | No (1DF) | 10 | No(1/81) | 80/81 |
| 9 | 8 | 4 | 0 | No (1DF) | 7 | No(1/81) | 80/81 |
| 2 | 10 | 40 | 17 | 10 | 0 | 3 | Yes | 13 | Yes | 1 |
| 5 | 14 | 4 | 0 | No (1DF) | 13 | Yes | 1 |
| 10 | 9 | 4 | 0 | Yes | 9 | Yes | 1 |

only block is even gets rid of tag effect in the Between Animals Within Runs stratum, the only exception is bRep = 8, nCag = 4, the cage has to confound with only runs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | Number of observation | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 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 |
| Treat | Block | Bio Rep | Runs | Tags | Average Eff Factor |
| Cage | Animal |
| 2 | 2 | 4 | 2 | 16 | 5 | 2 | 8 | 0 | 0 | No (2DF) | 3 | Yes | 1 |
| 4 | 3 | 0 | 0 | Yes | 3 | Yes | 1 |
| 2 | 6 | 24 | 9 | 3 | 0 | 1 | No (2DF) | 6 | No(1/9) | 8/9 |
| 3 | 8 | 1 | 0 | No (3DF) | 5 | No(1/9) | 8/9 |
| 6 | 5 | 1 | 0 | No (2DF) | 3 | No(1/9) | 8/9 |
| 2 | 8 | 32 | 13 | 4 | 0 | 1 | No (2DF) | 10 | Yes | 1 |
| 4 | 11 | 0 | 1 | Yes | 10 | Yes | 1 |
| 8 | 7 | 1 | 0 | Yes | 7 | Yes | 1 |
| 2 | 10 | 40 | 17 | 5 | 0 | 2 | No (2DF) | 13 | No(1/25) | 24/25 |
| 5 | 14 | 2 | 0 | No (3DF) | 11 | No(1/25) | 24/25 |
| 10 | 9 | 2 | 0 | No (2DF) | 7 | No(1/25) | 24/25 |

only block is even gets rid of 1 of 3 DF associated with the tag effect in the Between Animals Within Runs stratum,

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 3 | 2 | 2 | 2 | 12 | 2 | 3 | 4 | 0 | 1(1) | Yes | 1 | Yes | 1, 3/4 | 6/7 |
| 2 | 4 | 24 | 8 | 6 | 0 | 2(2) | Yes | 6 | Yes | 15/16 (2) | 15/16 |
| 4 | 6 | 0 | 2(2) | Yes | 4 | Yes | 15/16 (2) | 15/16 |
| 2 | 6 | 36 | 14 | 9 | 0 | 4(2) | Yes | 10 | Yes | 23/24, 7/8 | 0.9148 |
| 3 | 13 | 1 | 3(2) | No (1DF) | 9 | Yes | 23/24, 7/8 | 0.9148 |
| 6 | 10 | 1 | 3(2) | Yes | 7 | Yes | 23/24, 7/8 | 0.9148 |
| 2 | 8 | 48 | 20 | 12 | 0 | 5(2) | Yes | 15 | Yes | 15/16 (2) | 15/16 |
| 4 | 18 | 1 | 4(2) | Yes | 14 | Yes | 15/16 (2) | 15/16 |
| 8 | 14 | 1 | 4(2) | Yes | 10 | Yes | 15/16 (2) | 15/16 |
| 2 | 10 | 60 | 26 | 15 | 0 | 7(2) | Yes | 19 | Yes | 19/20, 9/10 | 0.9243 |
| 5 | 23 | 2 | 5(2) | No (1DF) | 17 | Yes | 19/20, 9/10 | 0.9243 |
| 10 | 18 | 2 | 5(2) | Yes | 13 | Yes | 19/20, 9/10 | 0.9243 |

only block is even gets rid of 1 of 1 DF associated with the tag effect in the Between Animals Within Runs stratum,

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 3 | 2 | 4 | 2 | 24 | 8 | 3 | 8 | 0 | 1(1) | No(2) | 5 | Yes | 1, 15/16 | 30/31 |
| 4 | 6 | 0 | 1(1) | Yes | 5 | Yes | 1, 15/16 | 30/31 |
| 2 | 8 | 48 | 20 | 6 | 0 | 2(2) | No(2) | 16 | Yes | 63/64(2) | 63/64 |
| 4 | 18 | 0 | 2(2) | Yes | 16 | Yes | 63/64(2) | 63/64 |
| 8 | 14 | 0 | 2(2) | Yes | 12 | Yes | 63/64(2) | 63/64 |

only block is even gets rid of the tag effect in the Between Animals Within Runs stratum,

2 blocks only get rid 1 DF out of 3 DF, 4 and 8 block get rid of all 3DF. But neither affects the DF of residual at all.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 in the between Runs stratum (Trt DF) | | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | Tag orthogonal to Treatment | Treatment | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 4 | 2 | 2 | 2 | 16 | 3 | 4 | 4 | 0 | 1 | Yes | 2 | Yes | 1(3) | 1 |
| 3 | 3 | 24 | 6 | 6 | 2 | 0 | No (1DF) | 5 | No(1/9) | 1(2), 8/9 | 24/25 |
| 2 | 4 | 32 | 11 | 8 | 0 | 3 | Yes | 8 | Yes | 1(3) | 1 |
| 4 | 9 | 3 | 0 | No (1DF) | 8 | Yes | 1(3) | 1 |
| 5 | 5 | 40 | 12 | 10 | 4 | 0 | No (1DF) | 11 | No(1/25) | 1(2), 24/25 | 72/73 |
| 2 | 6 | 48 | 19 | 12 | 0 | 5 | Yes | 14 | Yes | 1(3) | 1 |
| 3 | 18 | 2 | 3 | No (1DF) | 14 | Yes | 1(3) | 1 |
| 6 | 15 | 5 | 0 | No (1DF) | 14 | Yes | 1(3) | 1 |
| 7 | 7 | 56 | 18 | 14 | 6 | 0 | No (1DF) | 17 | No(1/49) | 1(2), 48/49 | 144/145 |
| 2 | 8 | 64 | 27 | 16 | 0 | 7 | Yes | 20 | Yes | 1(3) | 1 |
| 4 | 25 | 3 | 4 | No (1DF) | 20 | Yes | 1(3) | 1 |
|  |  | 1 | 6 | Yes | 19 | Yes | 1(3) | 1 |
| 8 | 21 | 7 | 6 | No (1DF) | 20 | Yes | 1(3) | 1 |
| 3 | 9 | 72 | 30 | 18 | 2 | 6 | No (1DF) | 23 | No(1/81) | 1(2), 80/81 | 240/241 |
| 9 | 24 | 8 | 0 | No (1DF) | 23 | No(1/81) | 1(2), 80/81 | 240/241 |
| 2 | 10 | 80 | 35 | 20 | 0 | 9 | Yes | 26 | Yes | 1(3) | 1 |
| 5 | 32 | 4 | 5 | No (1DF) | 26 | Yes | 1(3) | 1 |
| 10 | 27 | 9 | 0 | No (1DF) | 26 | Yes | 1(3) | 1 |

Only block = 2 gets rid of tag effect in the Between Animals Within Runs stratum, the remaining need to confounded with runs first to maximise the residual DF

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 in the between Runs stratum (Trt DF) | | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | Tag orthogonal to Treatment | Treatment | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 4 | 2 | 2 | 2 | 16 | 3 | 2 | 8 | 0 | 0 | No (2DF) | 1 | No (1/2) | 1, 1/2(2) | 3/5 |
| 3 | 3 | 24 | 6 | 3 | 1 | 0 | No (3DF) | 3 | No (1/9) | 8/9 (3) | 8/9 |
| 2 | 4 | 32 | 11 | 4 | 0 | 1 | No (2DF) | 8 | Yes | 1 (3) | 1 |
| 4 | 9 | 0 | 1 | Yes | 8 | Yes | 1 (3) | 1 |
| 5 | 5 | 40 | 12 | 5 | 2 | 0 | No (3DF) | 9 | No (1/25) | 24/25 (3) | 24/25 |
| 2 | 6 | 48 | 19 | 6 | 0 | 2 | No (2DF) | 15 | No (1/18) | 1, 17/18(2) | 51/53 |
| 3 | 18 | 2 | 0 | No (3DF) | 15 | No (1/18) | 1, 17/18(2) | 51/53 |
| 6 | 15 | 2 | 0 | No (2DF) | 13 | No (1/18) | 1, 17/18(2) | 51/53 |
| 7 | 7 | 56 | 18 | 7 | 3 | 0 | No (3DF) | 15 | No (1/49) | 48/49 (3) | 48/49 |
| 2 | 8 | 64 | 27 | 8 | 0 | 3 | No (2DF) | 22 | Yes | 1 (3) | 1 |
| 4 | 25 | 0 | 3 | Yes | 22 | Yes | 1 (3) | 1 |
| 8 | 21 | 1 | 2 | Yes | 19 | Yes | 1 (3) | 1 |
| 3 | 9 | 72 | 30 | 9 | 2 | 2 | No (3DF) | 24 | No (1/81) | 80/81(3) | 80/81 |
| 9 | 24 | 4 | 0 | No (3DF) | 21 | No (1/81) | 80/81(3) | 80/81 |
| 2 | 10 | 80 | 35 | 10 | 0 | 4 | No (2DF) | 29 | No (1/50) | 1, 49/50(2) | 147/149 |
| 5 | 32 | 4 | 0 | No (3DF) | 29 | No (1/50) | 1, 49/50(2) | 147/149 |
| 10 | 27 | 4 | 0 | No (2DF) | 25 | No (1/50) | 1, 49/50(2) | 147/149 |

only block = 2, 4 and 8 gets rid of tag effect in the Between Animals Within Runs stratum.

2 blocks only get rid 1 DF out of 3 DF, 4 and 8 block get rid of all 3DF. But neither affects the DF of residual at all. The highlight one did not add up to expect DF for the residual, this is due to the confounding between the cages and animals within cages

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 5 | 2 | 2 | 2 | 20 | 4 | 5 | 4 | 0 | 2 (2Trt) | Yes | 2 | Yes | 1(2), 7/8, 5/8 | 70/83 |
| 2 | 4 | 40 | 14 | 10 | 0 | 4 (4Trt) | Yes | 10 | Yes | 15/16(4) | 15/16 |
| 4 | 12 | 0 | 4 (4Trt) | Yes | 8 | Yes | 15/16(4) | 15/16 |
| 2 | 6 | 60 | 24 | 15 | 0 | 7 (4Trt) | Yes | 17 | Yes | 23/24(2), 11/12, 5/6 | 0.9137 |
| 3 | 23 | 1 | 6 (4Trt) | No(1DF) | 16 | Yes | 23/24(2), 11/12, 5/6 | 0.9137 |
| 6 | 20 | 1 | 6 (4Trt) | Yes | 14 | Yes | 23/24(2), 11/12, 5/6 | 0.9137 |
| 2 | 8 | 80 | 34 | 20 | 1 | 9 (4Trt) | Yes | 25 | Yes | 15/16 (4), | 15/16 |
| 4 | 32 | 1 | 8 (4Trt) | Yes | 24 | Yes | 15/16 (4), | 15/16 |
| 8 | 28 | 1 | 8 (4Trt) | Yes | 20 | Yes | 15/16 (4), | 15/16 |
| 2 | 10 | 100 | 44 | 25 | 0 | 12 (4Trt) | Yes | 32 | Yes | 19/20(2), 37/40 7/8 | 0.9240 |
| 5 | 41 | 2 | 10 (4Trt) | No(1DF) | 30 | Yes | 19/20(2), 37/40 7/8 | 0.9240 |
| 10 | 36 | 2 | 10(4Trt) | Yes | 26 | Yes | 19/20(2), 37/40 7/8 | 0.9240 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 5 | 2 | 4 | 2 | 40 | 14 | 5 | 8 | 0 | 2(2 Trt) | No(2DF) | 10 | Yes | 1 (2), 15/16 (2) | 30/31 |
| 4 | 12 | 0 | 2(2 Trt) | Yes | 10 | Yes | 1 (2), 15/16 (2) | 30/31 |
| 2 | 8 | 80 | 34 | 10 | 0 | 4(4 Trt) | No(2DF) | 28 | Yes | 0.994(2), 0.959(2) | 781/800 |
| 4 | 32 | 0 | 4(4 Trt) | Yes | 28 | Yes | 0.994(2), 0.959(2) | 781/800 |
| 8 | 28 | 0 | 4(4 Trt) | Yes | 24 | Yes | 0.994(2), 0.959(2) | 781/800 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 in the between Runs stratum (Trt DF) | | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | Tag orthogonal to Treatment | Treatment | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 6 | 2 | 2 | 2 | 24 | 5 | 6 | 4 | 0 | 2(2) | Yes | 3 | Yes | 1(3), 3/4(2) | 15/17 |
| 3 | 3 | 36 | 10 | 9 | 2(2) | 2(2) | No(1DF) | 5 | No(1/9) | 0.9149, 0.9113, 8/9, 0.7445, 0.7315 | 0.8298 |
| 1 | 3(3) | No (1DF) | 6 | No(1/9) | 1, 0.894, 8/9, 5/6, 0.606 | 0.8204 |
| 2 | 4 | 48 | 17 | 12 | 0 | 4(4) | Yes | 12 | Yes | 1, 15/16(2), 13/16(2) | 0.8937 |
| 4 | 15 | 1 | 4(4) | Yes | 11 | Yes | 1, 15/16(2), 13/16(2) | 0.8937 |
| 5 | 5 | 60 | 20 | 15 | 2(2) | 4(4) | No (1DF) | 12 | No(0.0342) | 0.9519, 0.8926, 0.8832, 0.8211, 0.7973 | 0.8657 |
| 2 | 5(4) | No (1DF) | 14 | No(1/25) | 24/25, 19/20, 17/20(2), 3/4 | 0.8650 |
| 2 | 6 | 72 | 29 | 18 | 0 | 8(4) | Yes | 21 | Yes | 1, 7/8(4) | 0.8974 |
| 3 | 28 | 2 | 6(4) | No (1DF) | 21 | Yes | 1, 7/8(4) | 0.8974 |
| 6 | 25 | 2 | 6(4) | Yes | 19 | Yes | 1, 7/8(4) | 0.8974 |
| 7 | 7 | 84 | 30 | 21 | 3 | 7(5) | No (1DF) | 22 | No(1/49) | 0.947, 0.919, 25/28, 0.854, 0.795 | 0.8784 |
| 2 | 8 | 96 | 41 | 24 | 0 | 11(5) | Yes | 30 | Yes | 15/16(2), 7/8 (3) | 0.8990 |
| 4 | 39 | 3 | 8(5) | No (1DF) | 30 | Yes | 15/16(2), 7/8 (3) | 0.8990 |
| 8 | 35 | 3 | 8(4) | No (1DF) | 26 | Yes | 15/16(2), 7/8 (3) | 0.8990 |
| 3 | 9 | 108 | 46 | 27 | 2 | 11(5) | No (1DF) | 33 | No(1/81) | 0.927, 11/12, 0.887, 31/36, 0.840 | 0.8851996 |
| 9 | 40 | 4 | 9(5) | No (1DF) | 30 | No(1/81) | 0.937, 8/9(2), 0.884, 5/6 | 0.8851979 |
| 2 | 10 | 120 | 53 | 30 | 0 | 14(5) | Yes | 39 | Yes | 9/10(5) | 9/10 |
| 5 | 50 | 4 | 10(5) | No (1DF) | 39 | Yes | 9/10(5) | 9/10 |
| 10 | 45 | 4 | 10(5) | Yes | 35 | Yes | 9/10(5) | 9/10 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 6 | 2 | 2 | 2 | 24 | 5 | 3 | 8 | 0 | 1(1) | No (2DF) | 2 | No (4/9) | 1(2), 3/4 2/3, 1/3 | 0.6383 |
| 2 | 4 | 48 | 17 | 6 | 0 | 2(2) | No (2DF) | 13 | Yes | 1(3), 15/16(2) | 0.974 |
| 4 | 15 | 0 | 2(2) | Yes | 13 | Yes | 1(3), 15/16(2) | 0.974 |
| 2 | 6 | 72 | 29 | 9 | 0 | 4(4) | No (2DF) | 23 | No(4/81) | 47/48, 0.960, 0.942, 15/16, 0.903 | 0.9438 |
| 3 | 28 | 1 | 3(3) | No (3DF) | 22 | No(4/81) | 0.974, 26/27, 23/24, 25/27, 0.901 | 0.9437 |
| 6 | 25 | 1 | 3(3) | No (2DF) | 19 | No(4/81) | 0.974, 26/27, 23/24, 25/27, 0.901 | 0.9437 |
| 2 | 8 | 96 | 41 | 12 | 0 | 5(4) | No (2DF) | 34 | Yes | 1, 63/64(2), 61/64(2) | 0.9746 |
| 4 | 39 | 0 | 5(4) | Yes | 34 | Yes | 1, 63/64(2), 61/64(2) | 0.9746 |
| 8 | 35 | 0 | 4(4) | Yes | 31 | Yes | 1, 63/64(2), 61/64(2) | 0.9746 |
| 2 | 10 | 120 | 53 | 15 | 0 | 7(5) | No (2DF) | 44 | No(0.0178) | 39/40, 0.974, 0.962 19/20, 0.949 | 0.9619 |
| 5 | 50 | 2 | 5(4) | No (3DF) | 42 | No(0.0178) | 0.982, 0.974, 77/80 0.954, 15/16 | 0.9617471 |
| 10 | 45 | 2 | 5(4) | No (3DF) | 37 | No(0.04) | 79/80, 77/80(2), 24/25, 15/16 | 0.9617394 |

nBlock = 2 4 8

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| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 7 | 2 | 2 | 2 | 28 | 6 | 7 | 4 | 0 | 3(3) | Yes | 3 | Yes | 1(3), 7/8, 5/8, 1/2 | 0.7749 |
| 2 | 4 | 56 | 20 | 14 | 0 | 6(6) | Yes | 14 | Yes | 7/8(6) | 7/8 |
| 4 | 18 | 0 | 6(6) | Yes | 12 | Yes | 7/8(6) | 7/8 |
| 2 | 6 | 84 | 34 | 21 | 0 | 10(6) | Yes | 24 | Yes | 7/8(5), 19/24 | 0.8599 |
| 3 | 33 | 1 | 9(6) | No(1DF) | 23 | Yes | 0.934, 7/8(3), 0.816, 19/24 | 0.8586 |
| 2(2) | 8(6) | No(1DF) | 22 | Yes | 7/8(3), 0.874, 0.870, 0.791 | 0.8588 |
| 6 | 30 | 1 | 9(6) | Yes | 21 | Yes | 0.934, 7/8(3), 0.816, 19/24 | 0.8586 |
| 2 | 8 | 112 | 48 | 28 | 0 | 13(6) | Yes | 35 | Yes | 7/8(6) | 7/8 |
| 4 | 46 | 1 | 12(6) | Yes | 34 | Yes | 7/8(6) | 7/8 |
| 8 | 42 | 1 | 12(6) | Yes | 30 | Yes | 7/8(6) | 7/8 |
| 2 | 10 | 140 | 62 | 35 | 0 | 17(6) | Yes | 45 | Yes | 7/8(5), 33/40 | 0.8663 |
| 5 | 59 | 4 | 15(6) | No(1DF) | 43 | Yes | 7/8(5), 33/40 | 0.8663 |
| 10 | 54 | 2 | 15(6) | Yes | 39 | Yes | 7/8(5), 33/40 | 0.8663 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF 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 | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 7 | 2 | 4 | 2 | 56 | 20 | 7 | 8 | 0 | 3(3) | No(2DF) | 15 | Yes | 1(3), 31/32(2), 7/8 | 0.9666 |
| 4 | 18 | 0 | 3(3) | Yes | 15 | Yes | 1(3), 31/32(2), 7/8 | 0.9666 |
| 2 | 8 | 112 | 48 | 14 | 0 | 6(6) | No(2DF) | 40 | Yes | 63/64 (6) | 63/64 |
| 4 | 46 | 0 | 6(6) | Yes | 40 | Yes | 63/64 (6) | 63/64 |
| 8 | 42 | 0 | 6(6) | Yes | 36 | Yes | 63/64 (6) | 63/64 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 in the between Runs stratum (Trt DF) | | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | Tag orthogonal to Treatment | Treatment | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 8 | 2 | 2 | 2 | 32 | 7 | 8 | 4 | 0 | 3(3) | Yes | 4 | Yes | 1(4), 3/4(2), 1/2 | 0.8077 |
| 3 | 3 | 48 | 14 | 12 | 2 | 3(3) | No(1DF) | 10 | No(1/9) | 1(3), 8/9 2/3(3) | 0.8116 |
| 1 | 4(4) | No(1DF) | 9 | No(1/9) | 1(2), 8/9 5/6(2), 2/3(2) | 0.8211 |
| 2(2) | 3(3) | No(1DF) | 8 | No(1/9) | 1, 0.913(2), 8/9. 0.746(2), 2/3 | 0.8237 |
| 2 | 4 | 64 | 23 | 16 | 0 | 7(7) | Yes | 16 | Yes | 0.963(2),  7/8(2),  0.787(2),  3/4 | 0.8498 |
| 4 | 21 | 3 | 4(4) | No(1DF) | 16 | Yes | 1(3),  3/4(4) | 0.84 |
| 2 | 5(5) | No(1DF) | 15 | Yes | 1(2), 7/8(2),  3/4(3) | 0.8448 |
| 2(2) | 4(4) | No(1DF) | 14 | Yes | 1, 0.934(2),  0.809(2),  3/4(2) | 0.8456 |
| 0 | 7(7) | No(1DF) | 13 | Yes | 0.963(2),  7/8(2),  0.787(2),  3/4 | 0.8498 |
| 0 | 7(7) | Yes | 14 | Yes | 0.963(2),  7/8(2),  0.787(2),  3/4 | 0.8498 |
| 5 | 5 | 80 | 28 | 20 | 4 | 5(5) | No(1DF) | 22 | No(1/25) | 1, 24/25, 4/5(5) | 0.8442 |
| 3 | 6(6) | No(1DF) | 21 | No(1/25) | 0.984, 9/10, 0.876, 4/5(4) | 0.8465 |
| 2 | 7(7) | No(1DF) | 20 | No(1/25) | 9/10(3), 43/50, 4/5(3) | 0.8489 |
| 2 | 6 | 96 | 39 | 24 | 0 | 11(6) | Yes | 28 | Yes | 1, 5/6(6) | 0.8537 |
| 3 | 38 | 2 | 9(6) | No(1DF) | 28 | Yes | 1, 5/6(6) | 0.8537 |
| 6 | 35 | 5 | 6(6) | No(1DF) | 28 | Yes | 1, 5/6(6) | 0.8537 |
|  | 2 | 9(6) | Yes | 26 | Yes | 1, 5/6(6) | 0.8537 |
| 7 | 7 | 112 | 42 | 28 | 6 | 7(7) | No(1DF) | 34 | No(1/49) | 6/7(6), 41/49 | 0.8542 |
| 2 | 8 | 128 | 55 | 32 | 0 | 15(7) | Yes | 40 | Yes | 0.919(2), 7/8, 0.831(2), 13/16 (2) | 0.8550 |
| 4 | 53 | 3 | 12(7) | No(1DF) | 40 | Yes | 0.919(2), 7/8, 0.831(2), 13/16 (2) | 0.8550 |
| 1 | 14(7) | Yes | 39 | Yes | 0.919(2), 7/8, 0.831(2), 13/16 (2) | 0.8550 |
| 8 | 49 | 7 | 8(7) | No(1DF) | 40 | Yes | 7/8 (6), 3/4 | 0.8547 |
| 6 | 9(7) | No(1DF) | 39 | Yes | 0.914,  7/8(4),  13/16,  0.774 | 0.8548 |
| 5 | 10(7) | No(1DF) | 38 | Yes | 15/16, 7/8 (3), 13/16(3) | 0.8549571 |
| 4 | 11(7) | No(1DF) | 37 | Yes |
| 3 | 12(7) | Yes | 37 | Yes | 0.919(2), 7/8, 0.831(2), 13/16 (2) | 0.8549602 |
| 3 | 9 | 144 | 62 | 36 | 2 | 15(7) | No(1DF) | 46 | No(1/81) | 8/9(2), 71/81,  5/6(4) | 0.8546 |
| 9 | 56 | 8 | 9(7) | No(1DF) | 46 | No(1/81) | 8/9(4),  71/81, 7/9(2) | 0.8523 |
| 7 | 9(7) | No(1DF) | 45 | No(1/81) | 8/9(3), 71/81, 5/6(2), 7/9 | 0.8535 |
| 6 | 11(7) | No(1DF) | 44 | No(1/81) | 8/9(2), 71/81,  5/6(4) | 0.8546 |
| 2 | 10 | 160 | 71 | 40 | 0 | 19(7) | Yes | 52 | Yes | 9/10, 0.885(2), 17/20(2), 0.815(2) | 0.8559 |
| 5 | 68 | 4 | 15(7) | No(1DF) | 52 | Yes | 9/10, 0.885(2), 17/20(2), 0.815(2) | 0.8559 |
| 10 | 63 | 9 | 10(7) | No(1DF) | 52 | Yes | 9/10(4), 8/10(3) | 0.8542 |
|  |  | 8 | 11(7) | No(1DF) | 51 | Yes | 9/10(3), 17/20(2), 4/5(2) | 0.8551 |
|  |  | 7 | 12(7) | No(1DF) | 50 | Yes | 9/10(2), 7/8(2), 33/40(2), 4/5 | 0.8555 |
|  |  | 6 | 13(7) | No(1DF) | 49 | Yes | 9/10, 0.885(2), 17/20(2), 0.815(2) | 0.8559 |
|  |  |  |  |  |  |  |  | 3 | 16(7) | Yes | 47 | Yes | 9/10, 0.885(2), 17/20(2), 0.815(2) | 0.8559 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase 1 Experiment | | | Technical Rep | n | DF of residual in between animals stratum | Phase 2 Experiment | | DF of Phase 1 in the between Runs stratum (Trt DF) | | Tag orthogonal to Animal in the within runs stratum | DF of residual in between animals stratum | Tag orthogonal to Treatment | Treatment | |
| Treat | Block | Bio Rep | Runs | Tags | Can Eff Factor | Ave Eff Factor |
| Cage | Animal |
| 8 | 2 | 2 | 2 | 32 | 7 | 4 | 8 | 1 | 0 | No(3DF) | 4 | No(3/10) | 1(4), 3/4(2), 1/2 | 21/26 |
| 0 | 1 | No(2DF) | 4 | No(1/2) | 1(5), 1/2(2) | 7/9 |
| 3 | 3 | 48 | 14 | 6 | 2 | 0 | No(3DF) | 5 | No(1/9) | 1(4), 8/9(3) | 56/59 |
| 2 | 4 | 64 | 23 | 8 | 0 | 3 | No(2DF) | 18 | Yes | 1(7) | 1 |
| 4 | 21 | 3 | 0 | No(3DF) | 18 | Yes | 1(7) | 1 |
|  |  |  |  |  | 0 | 3 | Yes | 18 | Yes | 1(7) | 1 |
| 5 | 5 | 80 | 28 | 10 | 4 | 0 | No(3DF) | 25 | No(1/25) | 1(4), 24/25(3) | 56/57 |
| 2 | 6 | 96 | 39 | 12 | 0 | 5 | No(2DF) | 32 | No(1/30) | 1(4), 35/36(2), 17/18 | 0.9837 |
| 3 | 38 | 2 | 3 | No(3DF) | 32 | No(1/30) | 1(4), 35/36(2), 17/18 | 0.9837 |
| 6 | 35 | 5 | 0 | No(3DF) | 32 | No(1/30) | 1(4), 35/36(2), 17/18 | 0.9837 |
| 4 | 1 | No(2DF) | 28 | No(1/18) | 1(5), 17/18(2) | 0.9835 |
| 7 | 7 | 112 | 42 | 14 | 6 | 0 | No(3DF) | 39 | Yes | 1(4), 48/49(3) | 0.9912 |
| 2 | 8 | 128 | 55 | 16 | 0 | 7 | No(2DF) | 46 | Yes | 1(7) | 1 |
| 4 | 53 | 3 | 4 | No(3DF) | 46 | Yes | 1(7) | 1 |
| 0 | 7 | Yes | 46 | Yes | 1(7) | 1 |
| 8 | 49 | 7 | 0 | No(3DF) | 46 | Yes | 1(7) | 1 |
|  | 1 | 6 | Yes | 43 | Yes | 1(7) | 1 |
| 3 | 9 | 144 | 62 | 18 | 2 | 6 | No(3DF) | 53 | No(1/81) | 1(4), 80/81(3) | 0.9947 |
| 9 | 56 | 8 | 0 | No(3DF) | 53 | No(1/81) | 1(4), 80/81(3) | 0.9947 |
| 2 | 10 | 160 | 71 | 20 | 1 | 8 | No(3DF) | 60 | No(0.012) | 1(4), 99/100(2), 49/50 | 0.9942 |
|  |  | 0 | 9 | No(2DF) | 60 | No(0.02) | 1(5), 49/50(2) | 0.9942 |
| 5 | 68 | 4 | 5 | No(3DF) | 60 | No(0.012) | 1(4), 99/100(2), 49/50 | 0.9942 |
| 10 | 63 | 9 | 0 | No(3DF) | 60 | No(0.012) | 1(4), 99/100(2), 49/50 | 0.9942 |