**Supplement 3**

Table S3.1. AUC results of models based on the for the individual colony and year approach. Here, the training and the testing dataset consisted of the data from one colony and one year each, and the model structure was based on the best fitting model for the training dataset. Fields marked in light grey refer to transferability between years within the same colony, fields in white to transferability between colonies.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Training dataset** | **Testing dataset** |  |  |  |  |  |  |  |  |  |  |  |
| Hornøya 2011 | Hornøya 2012 | Røst 2019 | Røst 2020 | Sklinna 2011 | Sklinna 2012 | Sklinna 2013 | Sklinna 2014 | Sklinna 2015 | Sklinna 2016 | Sklinna 2017 | Sklinna 2018 | Sklinna 2019 | Sklinna 2020 | Runde 2017 | Runde 2020 | Jarstein 2019 | Jarstein 2020 |
| Hornøya 2011 |   | 0.5519 | 0.8216 | 0.8323 | 0.7333 | 0.7040 | 0.7433 | 0.7389 | 0.7446 | 0.7325 | 0.7439 | 0.5961 | 0.5299 | 0.7154 | 0.8450 | 0.8055 | 0.6674 | 0.5238 |
| Hornøya 2012 | 0.9832 |   | 0.7285 | 0.7796 | 0.7616 | 0.7921 | 0.7761 | 0.7676 | 0.7777 | 0.764 | 0.7726 | 0.7268 | 0.7749 | 0.7596 | 0.8680 | 0.7941 | 0.8743 | 0.8029 |
| Røst 2019 | 0.7185 | 0.783 |   | 0.8480 | 0.7238 | 0.6694 | 0.6906 | 0.8019 | 0.7571 | 0.7183 | 0.7242 | 0.7412 | 0.7962 | 0.7897 | 0.8723 | 0.9666 | 0.9435 | 0.9389 |
| Røst 2020 | 0.4553 | 0.8066 | 0.9078 |   | 0.5469 | 0.5571 | 0.6067 | 0.4863 | 0.5060 | 0.5506 | 0.5751 | 0.7493 | 0.7057 | 0.6451 | 0.8435 | 0.9027 | 0.8784 | 0.9405 |
| Sklinna 2011 | 0.9453 | 0.8643 | 0.5044 | 0.5644 |   | 0.7458 | 0.9684 | 0.7072 | 0.9742 | 0.5983 | 0.9569 | 0.7075 | 0.6716 | 0.5163 | 0.5777 | 0.6203 | 0.7201 | 0.7484 |
| Sklinna 2012 | 0.8444 | 0.9149 | 0.6618 | 0.6524 | 0.9293 |   | 0.6116 | 0.9781 | 0.8659 | 0.9706 | 0.6318 | 0.9131 | 0.8152 | 0.8662 | 0.6856 | 0.7964 | 0.8120 | 0.8495 |
| Sklinna 2013 | 0.9450 | 0.8635 | 0.5101 | 0.5706 | 0.9186 | 0.7515 |   | 0.7162 | 0.9821 | 0.6079 | 0.9785 | 0.7114 | 0.6754 | 0.5304 | 0.759 | 0.6177 | 0.7182 | 0.7463 |
| Sklinna 2014 | 0.6855 | 0.9055 | 0.6546 | 0.6326 | 0.6282 | 0.9541 | 0.6742 |   | 0.6078 | 0.9698 | 0.6497 | 0.8677 | 0.7857 | 0.8069 | 0.7596 | 0.7757 | 0.7969 | 0.8353 |
| Sklinna 2015 | 0.9490 | 0.8834 | 0.5491 | 0.5055 | 0.9583 | 0.7854 | 0.9763 | 0.7720 |   | 0.7330 | 0.9812 | 0.7648 | 0.7162 | 0.6318 | 0.9257 | 0.6783 | 0.7398 | 0.7721 |
| Sklinna 2016 | 0.8748 | 0.9073 | 0.6225 | 0.5926 | 0.8808 | 0.8689 | 0.5420 | 0.9778 | 0.8131 |   | 0.6100 | 0.9124 | 0.8371 | 0.8420 | 0.7492 | 0.7473 | 0.7765 | 0.8251 |
| Sklinna 2017 | 0.9499 | 0.8924 | 0.5808 | 0.5277 | 0.9565 | 0.7883 | 0.9607 | 0.7898 | 0.9783 | 0.7671 |   | 0.7706 | 0.7226 | 0.6474 | 0.7550 | 0.6887 | 0.7476 | 0.7823 |
| Sklinna 2018 | 0.7041 | 0.6353 | 0.5365 | 0.5602 | 0.7987 | 0.7712 | 0.8279 | 0.8227 | 0.8142 | 0.7688 | 0.8200 |   | 0.9353 | 0.7730 | 0.6999 | 0.8258 | 0.5170 | 0.5227 |
| Sklinna 2019 | 0.6161 | 0.4700 | 0.8519 | 0.8617 | 0.9480 | 0.9337 | 0.8737 | 0.9287 | 0.9272 | 0.9706 | 0.8478 | 0.9813 |   | 0.9720 | 0.5409 | 0.9836 | 0.9250 | 0.8253 |
| Sklinna 2020 | 0.9688 | 0.9406 | 0.6314 | 0.7443 | 0.9359 | 0.9341 | 0.9190 | 0.9556 | 0.9439 | 0.9455 | 0.9148 | 0.6465 | 0.5836 |   | 0.8144 | 0.7810 | 0.4893 | 0.9434 |
| Runde 2017 | 0.8238 | 0.9196 | 0.8658 | 0.6385 | 0.8907 | 0.9109 | 0.8871 | 0.8882 | 0.8712 | 0.8986 | 0.8576 | 0.9124 | 0.8783 | 0.9225 |   | 0.6428 | 0.7735 | 0.9517 |
| Runde 2020 | 0.9634 | 0.9655 | 0.9380 | 0.8910 | 0.6360 | 0.6864 | 0.6619 | 0.6310 | 0.6038 | 0.5460 | 0.6416 | 0.7035 | 0.6675 | 0.9347 | 0.9540 |   | 0.9798 | 0.9799 |
| Jarstein 2019 | 0.9234 | 0.8006 | 0.5044 | 0.8431 | 0.6219 | 0.6452 | 0.4973 | 0.6235 | 0.6303 | 0.8328 | 0.5343 | 0.7751 | 0.7234 | 0.9382 | 0.7126 | 0.9902 |   | 0.7177 |
| Jarstein 2020 | 0.6741 | 0.4713 | 0.5070 | 0.5695 | 0.5804 | 0.6361 | 0.5676 | 0.5955 | 0.6192 | 0.7516 | 0.5245 | 0.6947 | 0.6576 | 0.4867 | 0.5588 | 0.6148 | 0.6047 |   |