

Supplementary information

Odours of caterpillar-infested trees increase testosterone concentrations in male great tits.

Table S1: Comparison of the mean control and HIPV curves.

“Difference” represents the difference between the control and the HIPV curves. SE: Standard Error, CI upper: Upper bound of the 95% Confidence Interval, CI lower: Lower bound of the 95% Confidence Interval. The last column indicates if the 95% Confidence Interval around the difference overlap zero; if yes, it returns “FALSE”, meaning that the control and HIPV curves are not significantly different at this time point; if no, it returns “TRUE”, meaning that the curves are significantly different at this time point.

A: 17 β -estradiol (E₂)

<i>Day</i>	<i>Difference</i>	<i>SE</i>	<i>CI upper</i>	<i>CI lower</i>	<i>CI does not overlap zero</i>
-71	3,76541249	10,1458871	23,6513512	-16,1205262	FALSE
-69,6969697	3,69621131	9,96603434	23,2296386	-15,837216	FALSE
-68,39393939	3,62701007	9,78790529	22,8113044	-15,5572843	FALSE
-67,09090909	3,55780871	9,61161161	22,3965675	-15,2809501	FALSE
-65,78787879	3,48860716	9,43724775	21,9856127	-15,0083984	FALSE
-64,48484848	3,41940536	9,26489097	21,5785917	-14,7397809	FALSE
-63,18181818	3,35020327	9,09460228	21,1756237	-14,4752172	FALSE
-61,87878788	3,2810008	8,92642819	20,7768001	-14,2147985	FALSE
-60,57575758	3,21179857	8,76040575	20,3821938	-13,9585967	FALSE
-59,27272727	3,14259923	8,59657062	19,9918777	-13,7066792	FALSE
-57,96969697	3,07340781	8,43496074	19,6059309	-13,4591152	FALSE
-56,66666667	3,00423288	8,27562327	19,2244545	-13,2159887	FALSE
-55,36363636	2,93508513	8,11861256	18,8475657	-12,9773955	FALSE
-54,06060606	2,86597753	7,9639912	18,4754003	-12,7434452	FALSE
-52,75757576	2,79692531	7,81182871	18,1081096	-12,514259	FALSE
-51,45454545	2,72794478	7,66219673	17,7458504	-12,2899608	FALSE
-50,15151515	2,65905241	7,51516486	17,3887755	-12,0706707	FALSE
-48,84848485	2,59026664	7,37080294	17,0370404	-11,8565071	FALSE
-47,54545455	2,52160937	7,2291822	16,6908065	-11,6475877	FALSE
-46,24242424	2,45310584	7,09037295	16,3502368	-11,4440251	FALSE
-44,93939394	2,38478427	6,95444325	16,015493	-11,2459245	FALSE
-43,63636364	2,31667561	6,82145929	15,6867358	-11,0533846	FALSE
-42,33333333	2,24881316	6,69148703	15,3641277	-10,8665014	FALSE
-41,03030303	2,18123231	6,56459465	15,0478378	-10,6853732	FALSE
-39,72727273	2,11397018	6,44085476	14,7380455	-10,5101051	FALSE
-38,42424242	2,04706532	6,32034569	14,4349429	-10,3408122	FALSE
-37,12121212	1,98055736	6,20315127	14,1387338	-10,1776191	FALSE
-35,81818182	1,91448671	6,08935919	13,8496307	-10,0206573	FALSE
-34,51515152	1,84889419	5,97905852	13,5678489	-9,87006051	FALSE
-33,21212121	1,7838207	5,87233716	13,2936015	-9,72596013	FALSE

-31,90909091	1,71930681	5,76928004	13,0270957	-9,58848206	FALSE
-30,60606061	1,65539242	5,66996879	12,7685312	-9,45774641	FALSE
-29,3030303	1,59211628	5,5744829	12,5181028	-9,33387021	FALSE
-28	1,52951562	5,48290199	12,2760035	-9,21697229	FALSE
-26,6969697	1,46762571	5,39530839	12,0424302	-9,10717874	FALSE
-25,39393939	1,40647939	5,3117892	11,8175862	-9,00462744	FALSE
-24,09090909	1,34610663	5,23243685	11,6016829	-8,90946959	FALSE
-22,78787879	1,28653421	5,15734804	11,3949364	-8,82186795	FALSE
-21,48484848	1,22778523	5,08662114	11,1975627	-8,74199221	FALSE
-20,18181818	1,16987892	5,02035279	11,0097704	-8,67001255	FALSE
-18,87878788	1,1128303	4,95863454	10,831754	-8,6060934	FALSE
-17,57575758	1,05665012	4,90155072	10,6636895	-8,55038929	FALSE
-16,27272727	1,00134471	4,84917779	10,5057332	-8,50304374	FALSE
-14,96969697	0,94691616	4,80158534	10,3580234	-8,4641911	FALSE
-13,66666667	0,89336243	4,7588382	10,2206853	-8,43396043	FALSE
-12,36363636	0,84067765	4,72099865	10,093835	-8,41247971	FALSE
-11,06060606	0,78885261	4,6881278	9,9775831	-8,39987787	FALSE
-9,757575758	0,73787524	4,66028524	9,87203432	-8,39628383	FALSE
-8,454545455	0,68773125	4,63752718	9,77728451	-8,40182201	FALSE
-7,151515152	0,63840482	4,61990294	9,69341458	-8,41660494	FALSE
-5,848484848	0,58987936	4,60745122	9,62048375	-8,44072502	FALSE
-4,545454545	0,54213827	4,60019692	9,55852423	-8,47424769	FALSE
-3,242424242	0,49516566	4,59814968	9,50753903	-8,51720771	FALSE
-1,939393939	0,44894707	4,60130432	9,46750354	-8,56960941	FALSE
-0,636363636	0,40347005	4,60964322	9,43837077	-8,63143066	FALSE
0,666666667	0,35872473	4,62313973	9,4200786	-8,70262913	FALSE
1,96969697	0,31470411	4,64176142	9,41255648	-8,78314827	FALSE
3,272727273	0,27140426	4,66547228	9,41572992	-8,87292141	FALSE
4,575757576	0,2288244	4,69423321	9,4295215	-8,9718727	FALSE
5,878787879	0,18696672	4,72800064	9,45384797	-9,07991454	FALSE
7,181818182	0,14583599	4,76672403	9,48861508	-9,1969431	FALSE
8,484848485	0,10543911	4,81034336	9,5337121	-9,32283387	FALSE
9,787878788	0,06578441	4,85878759	9,58900808	-9,45743926	FALSE
11,09090909	0,02688083	4,9119748	9,65435144	-9,60058979	FALSE
12,39393939	-0,01126297	4,96981453	9,7295735	-9,75209944	FALSE
13,6969697	-0,04863955	5,03221145	9,81449489	-9,91177398	FALSE
15	-0,08524371	5,09906967	9,90893285	-10,0794203	FALSE
16,3030303	-0,12107344	5,17029637	10,0127075	-10,2548543	FALSE
17,60606061	-0,15613082	5,24580379	10,1256446	-10,4379062	FALSE
18,90909091	-0,1904228	5,32550906	10,247575	-10,6284206	FALSE
20,21212121	-0,22396185	5,40933213	10,3783291	-10,8262528	FALSE
21,51515152	-0,25676642	5,49719259	10,5177311	-11,0312639	FALSE
22,81818182	-0,28886119	5,58900649	10,6655915	-11,2433139	FALSE
24,12121212	-0,32027713	5,68468434	10,8217042	-11,4622584	FALSE
25,42424242	-0,35105125	5,78413118	10,9858459	-11,6879484	FALSE
26,72727273	-0,38122627	5,88724859	11,157781	-11,9202335	FALSE

28,03030303	-0,41084986	5,9939384	11,3372694	-12,1589691	FALSE
29,33333333	-0,43997387	6,10410673	11,5240753	-12,4040231	FALSE
30,63636364	-0,46865327	6,21766745	11,7179749	-12,6552815	FALSE
31,93939394	-0,49694499	6,33454365	11,9187606	-12,9126506	FALSE
33,24242424	-0,52490667	6,45466693	12,1262405	-13,1760538	FALSE
34,54545455	-0,55259532	6,57797444	12,3402346	-13,4454252	FALSE
35,84848485	-0,58006598	6,70440477	12,5605674	-13,7206993	FALSE
37,15151515	-0,60737089	6,83389315	12,7870597	-14,0018015	FALSE
38,45454545	-0,63456012	6,96636681	13,0195188	-14,2886391	FALSE
39,75757576	-0,66167919	7,10174676	13,2577445	-14,5811028	FALSE
41,06060606	-0,68876994	7,2399488	13,5015297	-14,8790696	FALSE
42,36363636	-0,71586929	7,38088815	13,7506715	-15,1824101	FALSE
43,66666667	-0,74300657	7,52448637	14,0049867	-15,4909999	FALSE
44,96969697	-0,77020329	7,67067559	14,2643209	-15,8047275	FALSE
46,27272727	-0,7974732	7,8194003	14,5285514	-16,1234978	FALSE
47,57575758	-0,82482259	7,97061615	14,7975851	-16,4472302	FALSE
48,87878788	-0,85225103	8,12428576	15,0713491	-16,7758511	FALSE
50,18181818	-0,87975223	8,28037267	15,3497782	-17,1092827	FALSE
51,48484848	-0,90731593	8,43883373	15,6327982	-17,44743	FALSE
52,78787879	-0,93493106	8,59960971	15,920304	-17,7901661	FALSE
54,09090909	-0,96258619	8,76262495	16,2121587	-18,1373311	FALSE
55,39393939	-0,99026964	8,92778623	16,5081914	-18,4887307	FALSE
56,6969697	-1,01796984	9,09497993	16,8081908	-18,8441305	FALSE
58	-1,04567742	9,26408365	17,1119265	-19,2032814	FALSE

B: Testosterone

<i>Day</i>	<i>Difference</i>	<i>SE</i>	<i>CI upper</i>	<i>CI lower</i>	<i>CI does not overlap zero</i>
-71	2,11824583	2,53651287	4,97156522	7,08981105	FALSE
-69,61616162	1,91168201	2,36483261	4,63507192	6,54675393	FALSE
-68,23232323	1,70733229	2,20304993	4,31797786	6,02531015	FALSE
-66,84848485	1,5074108	2,05345046	4,02476291	5,5321737	FALSE
-65,46464646	1,31413164	1,91783662	3,75895977	5,07309141	FALSE
-64,08080808	1,12970894	1,79730983	3,52272727	4,65243621	FALSE
-62,6969697	0,95635679	1,69206413	3,31644569	4,27280249	FALSE
-61,31313131	0,79627775	1,60125649	3,13846273	3,93474048	FALSE
-59,92929293	0,65140356	1,52310335	2,98528257	3,63668613	FALSE
-58,54545455	0,52321588	1,45518488	2,85216237	3,37537825	FALSE
-57,16161616	0,41223447	1,3950087	2,73421706	3,14645153	FALSE
-55,77777778	0,3182831	1,34036834	2,62712194	2,94540505	FALSE
-54,39393939	0,24112062	1,2893576	2,5271409	2,76826151	FALSE
-53,01010101	0,18003366	1,2406461	2,43166636	2,61170003	FALSE
-51,62626263	0,13375367	1,19356455	2,33938652	2,47314019	FALSE
-50,24242424	0,10096101	1,14786341	2,24981228	2,35077329	FALSE
-48,85858586	0,07992515	1,10379913	2,16344629	2,24337144	FALSE
-47,47474747	0,06814821	1,06212868	2,08177221	2,14992042	FALSE

-46,09090909	0,062607	1,02375674	2,00656321	2,0691702	FALSE
-44,70707071	0,06007301	0,98937202	1,93916915	1,99924216	FALSE
-43,32323232	0,0574329	0,95922156	1,88007426	1,93750716	FALSE
-41,93939394	0,05199245	0,93308476	1,82884613	1,88083858	FALSE
-40,55555556	0,04174378	0,91043537	1,78445333	1,82619712	FALSE
-39,17171717	0,02558703	0,89069881	1,74576966	1,77135669	FALSE
-37,78787879	0,00338052	0,87343978	1,71194197	1,71532248	FALSE
-36,4040404	-0,02442519	0,85831835	1,68230396	1,65787876	FALSE
-35,02020202	-0,05644504	0,84521699	1,65662529	1,60018026	FALSE
-33,63636364	-0,090251	0,83422404	1,63507912	1,54482813	FALSE
-32,25252525	-0,12252302	0,82546196	1,61790545	1,49538243	FALSE
-30,86868687	-0,14928059	0,81890114	1,60504623	1,45576564	FALSE
-29,48484848	-0,1661598	0,81425727	1,59594425	1,42978445	FALSE
-28,1010101	-0,16872988	0,811017	1,58959331	1,42086343	FALSE
-26,71717172	-0,15282512	0,80857396	1,58480497	1,43197985	FALSE
-25,33333333	-0,11487708	0,80641728	1,58057787	1,46570079	FALSE
-23,94949495	-0,05215263	0,80425745	1,57634459	1,52419196	FALSE
-22,56565657	0,03746816	0,80192831	1,57177948	1,60924764	FALSE
-21,18181818	0,15501008	0,79949691	1,56701395	1,72202403	FALSE
-19,7979798	0,30001381	0,79729501	1,56269823	1,86271204	FALSE
-18,41414141	0,47048141	0,79576792	1,55970513	2,03018654	FALSE
-17,03030303	0,66292139	0,79528147	1,55875167	2,22167306	FALSE
-15,64646465	0,87248686	0,79596654	1,56009443	2,43258129	FALSE
-14,26262626	1,09317889	0,79766681	1,56342695	2,65660584	FALSE
-12,87878788	1,31813655	0,7999974	1,5679949	2,88613145	FALSE
-11,49494949	1,53997077	0,80248848	1,57287742	3,11284819	FALSE
-10,11111111	1,75112436	0,8047317	1,57727413	3,32839849	TRUE
-8,727272727	1,94411895	0,80633917	1,58042477	3,52454373	TRUE
-7,343434343	2,11198306	0,8070885	1,58189346	3,69387652	TRUE
-5,95959596	2,24870122	0,80706812	1,58185352	3,83055474	TRUE
-4,575757576	2,34951421	0,80660101	1,58093799	3,9304522	TRUE
-3,191919192	2,41116484	0,80609018	1,57993675	3,99110159	TRUE
-1,808080808	2,4320442	0,80584608	1,57945832	4,01150252	TRUE
-0,424242424	2,41227326	0,805974	1,57970904	3,9919823	TRUE
0,95959596	2,35368772	0,80635765	1,580461	3,93414872	TRUE
2,343434343	2,25972899	0,80673911	1,58120865	3,84093764	TRUE
3,727272727	2,13525862	0,80685142	1,58142878	3,7166874	TRUE
5,111111111	1,9859434	0,80640662	1,58055698	3,56650038	TRUE
6,494949495	1,81798628	0,80522882	1,57824848	3,39623476	TRUE
7,878787879	1,63813848	0,80347507	1,57481115	3,21294963	TRUE
9,262626263	1,45336465	0,80159671	1,57112955	3,02449421	FALSE
10,64646465	1,27050043	0,80018266	1,568358	2,83885844	FALSE
12,03030303	1,09592984	0,79974434	1,56749891	2,66342875	FALSE
13,41414141	0,9353017	0,80053421	1,56904704	2,50434874	FALSE
14,7979798	0,79328728	0,80247623	1,57285342	2,36614069	FALSE
16,18181818	0,67341214	0,80523167	1,57825407	2,25166622	FALSE

17,56565657	0,57795121	0,80837425	1,58441353	2,16236474	FALSE
18,94949495	0,50827183	0,81147849	1,59049784	2,09876967	FALSE
20,33333333	0,46497121	0,81428715	1,59600281	2,06097402	FALSE
21,71717172	0,4474798	0,81701991	1,60135902	2,04883881	FALSE
23,1010101	0,45417456	0,82036604	1,60791745	2,06209201	FALSE
24,48484848	0,48255989	0,82528029	1,61754938	2,10010927	FALSE
25,86868687	0,52948031	0,83265947	1,63201256	2,16149288	FALSE
27,25252525	0,5913593	0,84301915	1,65231754	2,24367684	FALSE
28,63636364	0,66443782	0,8563131	1,67837368	2,34281149	FALSE
30,02020202	0,74500946	0,87196873	1,70905871	2,45406817	FALSE
31,4040404	0,82963291	0,88912249	1,74268008	2,57231299	FALSE
32,78787879	0,91518166	0,90685521	1,77743621	2,69261787	FALSE
34,17171717	0,99888684	0,92444752	1,81191714	2,81080399	FALSE
35,55555556	1,07866945	0,94180726	1,84594223	2,92461167	FALSE
36,93939394	1,15319906	0,95951948	1,88065818	3,03385724	FALSE
38,32323232	1,2216023	0,97851063	1,91788084	3,13948314	FALSE
39,70707071	1,28355746	0,99988864	1,95978174	3,2433392	FALSE
41,09090909	1,33920763	1,02466559	2,00834455	3,34755218	FALSE
42,47474747	1,38907093	1,05361449	2,0650844	3,45415533	FALSE
43,85858586	1,43412389	1,08735927	2,13122416	3,56534805	FALSE
45,24242424	1,4755617	1,12642025	2,20778368	3,68334538	FALSE
46,62626263	1,51466463	1,17151698	2,29617328	3,81083791	FALSE
48,01010101	1,55270448	1,22395401	2,39894987	3,95165434	FALSE
49,39393939	1,59080963	1,28603146	2,52062166	4,1114313	FALSE
50,77777778	1,62983798	1,36095699	2,6674757	4,29731369	FALSE
52,16161616	1,67045467	1,45218105	2,84627485	4,51672952	FALSE
53,54545455	1,71321738	1,56271852	3,06292831	4,77614569	FALSE
54,92929293	1,75842576	1,69473466	3,32167994	5,0801057	FALSE
56,31313131	1,80633337	1,84917714	3,62438719	5,43072057	FALSE
57,6969697	1,85707451	2,02584132	3,97064899	5,8277235	FALSE
59,08080808	1,91051065	2,22355683	4,35817138	6,26868203	FALSE
60,46464646	1,96627198	2,44045268	4,78328726	6,74955924	FALSE
61,84848485	2,02389391	2,67415417	5,24134217	7,26523608	FALSE
63,23232323	2,0829113	2,92195421	5,72703025	7,80994155	FALSE
64,61616162	2,14285898	3,18097206	6,23470523	8,37756421	FALSE
66	2,20327182	3,44825923	6,7585881	8,96185992	FALSE



Figure S1: Picture of the opaque screen in climate-controlled aviaries.

Two trees or two pots were placed behind the opaque screen to prevent birds from seeing or eating buds or caterpillars. They could only smell them.

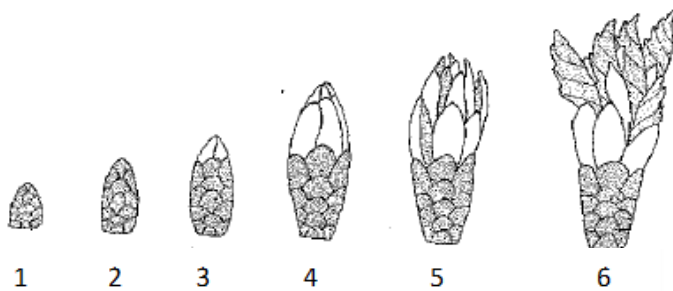


Figure S2: Illustration of bud phenological stages of deciduous oaks (*Quercus* sp.).

Caterpillars can enter the buds during the whole period from stipule lengthening (stage 4) until bud bursting (stage 6). Adapted from Du Merle & Mazet, 1983.

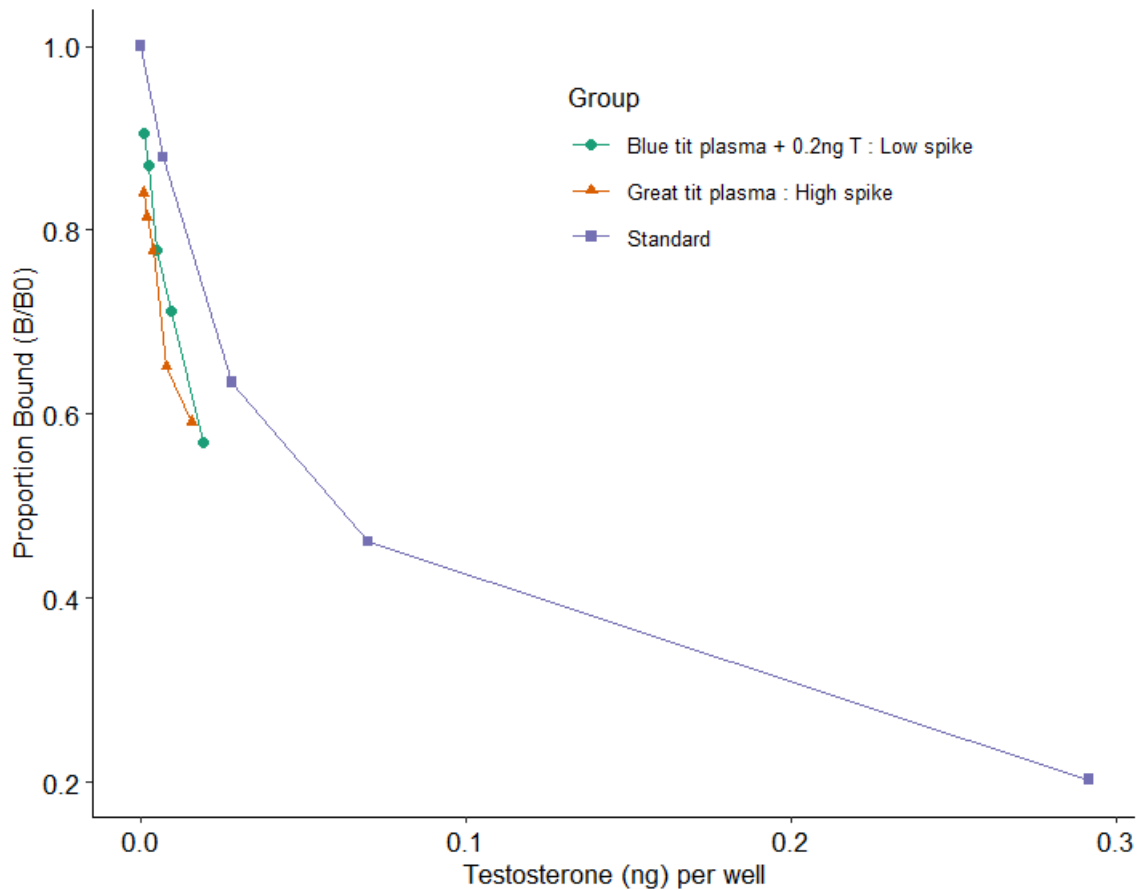


Figure S3: Testosterone assay validation for great tit and blue tit plasma.

To validate the assay in great tits, two plasma pools were created from samples collected from great tits in April 2021 and from blue tits in December 2015. The first pool was spiked without exogenous testosterone per well (high spike) because in April, birds are supposed to have high testosterone level, and the second pool was spiked with 0.2 ng of exogenous testosterone per well (low spike). Each plasma pool was then serially diluted to create a 5-point curve. During validation, testosterone was extracted from 50 μ L of plasma with DEE and methanol/dry ice bath, dried under nitrogen gas at 40°C, and resuspended overnight with 120 μ L assay buffer. Recovery after extraction was 91%.