

Table S1 Information collection status in different periods (N)

	2022					2023				
	01/07-02/06	02/07-03/06	03/07-04/06	04/07-04/30	total	01/07-02/06	02/07-03/06	03/07-04/06	04/07-04/30	total
Semen quality	372	1559	1346	725	4002	847	1594	1542	1102	5085
Sperm morphology (%)	241	1675	1334	619	3869	796	1462	1295	899	4452
FSH (mIU/ml)	171	1156	911	401	2639	612	964	632	367	2575
LH (mIU/ml)	172	1172	921	407	2672	622	968	631	367	2588
PRL (ng/ml)	152	1070	888	386	2496	505	920	604	346	2375
Testosterone (ng/ml)	167	1167	918	405	2657	615	962	633	366	2576
E2 (pg/ml)	164	1161	915	400	2640	611	961	631	363	2566
SHBG (nmol/ml)	136	1004	825	358	2323	461	868	588	327	2244
FTI (%)	136	1002	822	357	2317	459	866	577	319	2221
OH_VD (ng/ml)	99	814	667	300	1880	326	683	517	297	1823
Osteocalcin (ng/ml)	96	815	673	300	1884	327	692	546	322	1887
OHP (ng/ml)	117	915	728	310	1876	376	707	480	313	2070
Elastin (ng/ml)	172	1165	1014	462	2813	536	1134	793	507	2970

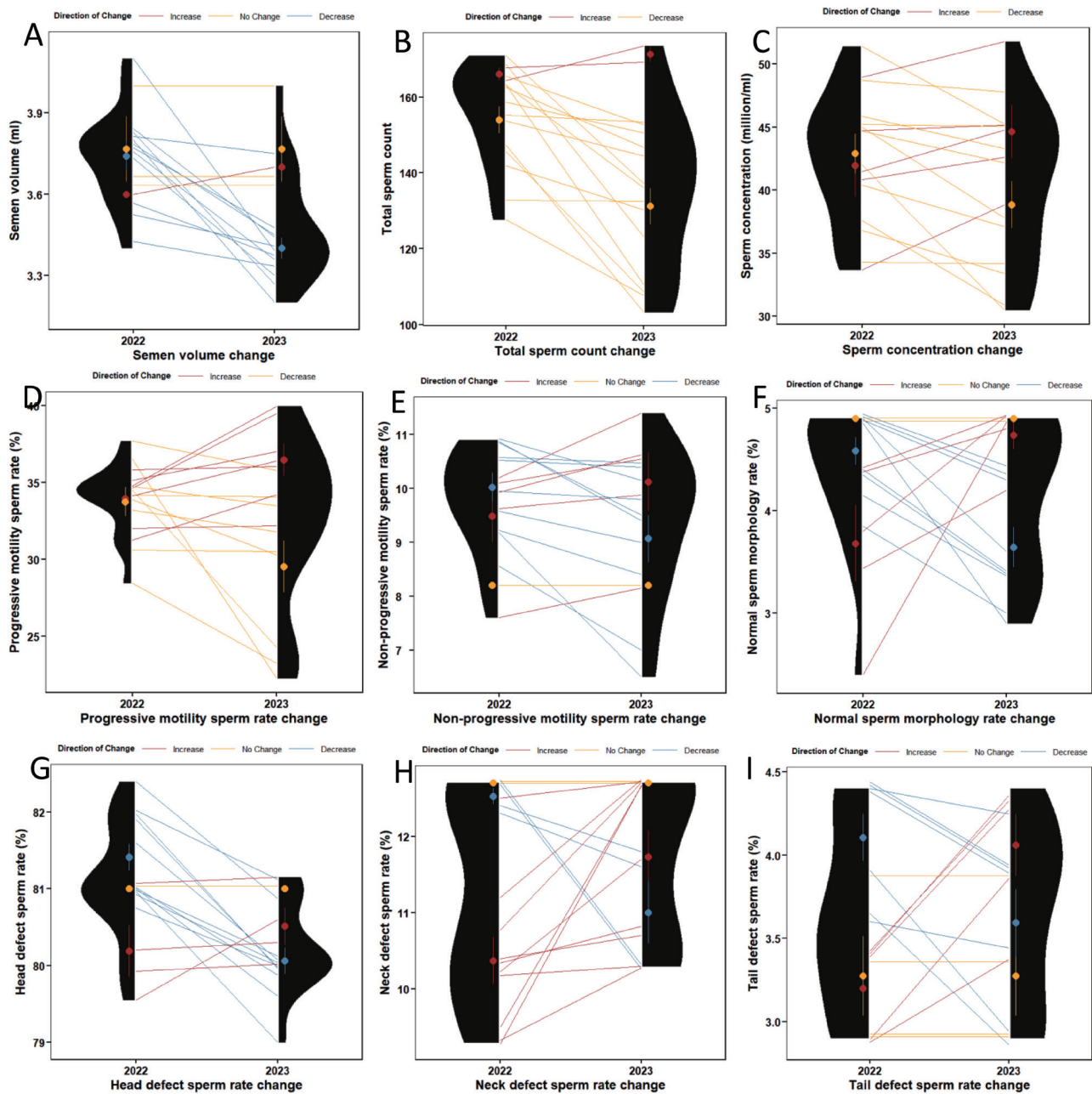


Figure S1 Distribution change in semen quality parameters. Each line represents the changing trend in the median of the corresponding weeks in 2022 and 2023. A. Distribution of semen volume ($P < 0.001$); B. Distribution change in total sperm count ($P < 0.001$); C. Distribution change in sperm concentration ($P = 0.002$); D. Distribution change in percentage of progressive sperm motility ($P = 0.26$); E. Distribution change in the percentage of nonprogressive sperm motility ($P = 0.045$); F. Changes in the distribution of normal sperm morphology ($P = 0.005$); G. Distribution change in the percentage of sperm head defects ($P < 0.001$); H. Distribution changes in the percentage of sperm neck defects ($P < 0.001$) and I. Change in the percentage of sperm tail defects ($P = 0.18$).

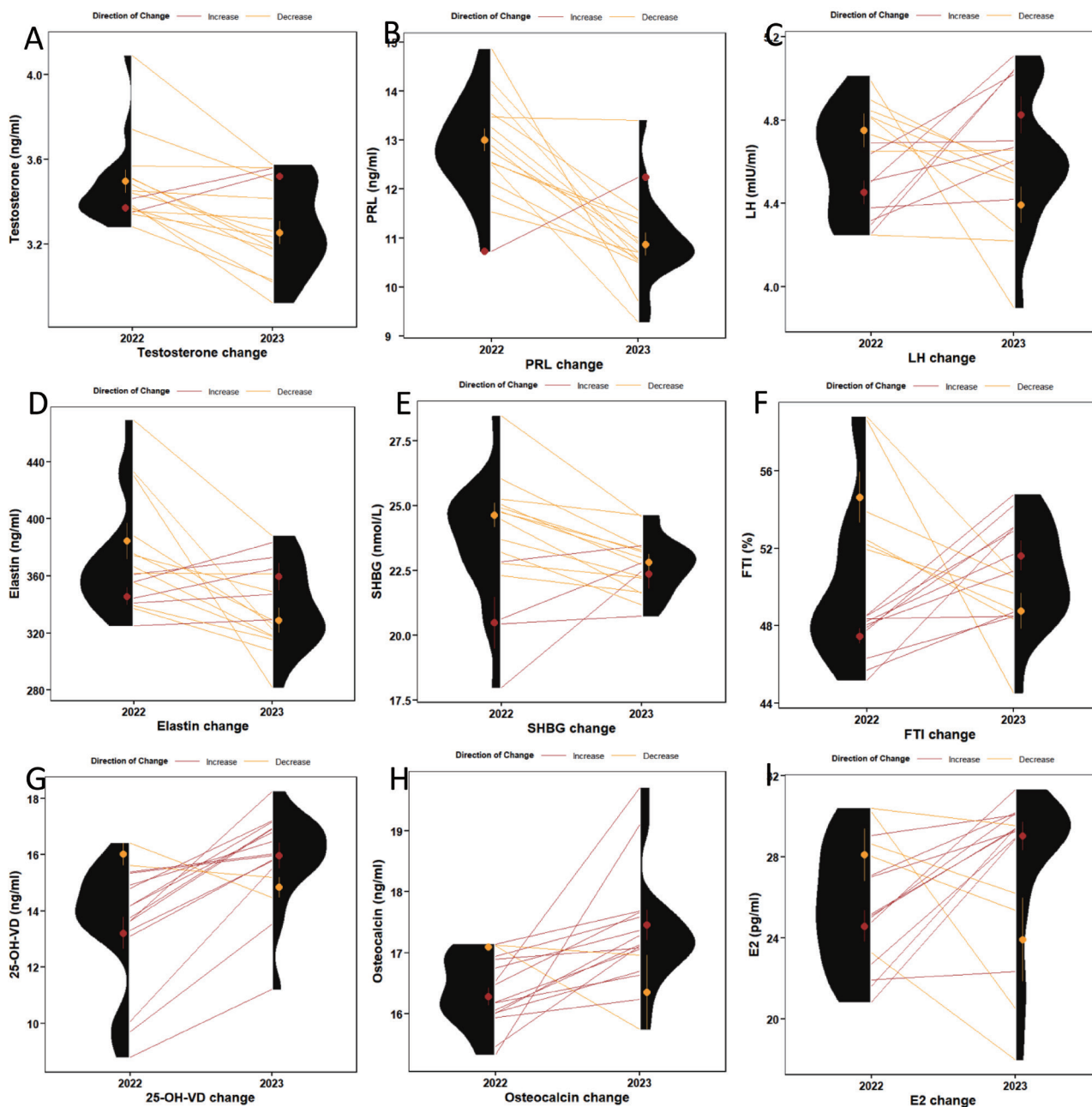


Figure S2 Distribution change in serum hormones. A. Distribution change in testosterone (T, $P < 0.001$); B. Distribution change in prolactin (PRL, $P < 0.001$); C. Distribution change in luteinizing hormone (LH, $P = 0.34$); D. Distribution change in elastase ($P = 0.35$); E. Distribution change in sex hormone-binding globulin (SHBG, $P < 0.001$); F. Distribution change in free testosterone index (FTI, $P = 0.06$); G. Distribution change in 25-OH-VD ($P < 0.001$); H. Distribution change in osteocalcin; and I. Distribution change in estrogen (E2, $P < 0.001$)