

Cock Hen Ratio: Breeding, Diet, Lighting, Selection: Tips From The Best of NFSS Forum

Below you will find a collection of comments, advice, and tips previously posted on the NFSS Forum. We hope you find the opinions of value. They represent the views of various members, participants in aviculture. If you would like to learn more about the wonderful and interesting world of finches... [become an NFSS Member](#) and join our Forum Or, if you find this article of use and would like to make a contribution to our society, [donations are welcome](#).

I once read something about the quality of foodstuffs and the bird's ability to survey the situation and produce chicks based on quality and availability of foodstuffs. My own personal research has shown me that the "richer" the nutrition, the higher the number of hens. In my situation, "rich" means protein. As it stands, I get a consistent 5:1, hens to cocks from every pair here. I prepare a dry "protein mix" that is about 54% protein (averaged from the items I mix together), then add about 1 1/2-2 cups of that protein mix to about 10-15lbs of my breeding seed mix (difficult to give exact amounts because I eyeball it for color and consistency when mixing).

Over the course of many years and breeding seasons (10+ years), I have adjusted this amount to see what happens. The years I use no additional protein, I get cocks 5:1, added protein but less than my current amount, I get closer to a 50/50 split, and the years I use my specific mix, hens 5:1.

Primary and secondary sex ratio manipulation by zebra finches
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Abstract: Wild zebra finches, *Taeniopygia guttata*, breed opportunistically when there is sufficient food available, often rapidly mobilizing their reproductive systems in response to an ephemeral boom in grass seed production. For females in captivity, fecundity, attractiveness to mates and survival to reproduction are all correlated with their fledging weight. By contrast, for males, only attractiveness is related to fledging weight; the relationship between fledging weight and male mortality is much weaker and that for male fecundity is unknown. Previous work thus suggests that how much food nestlings receive will have a profound impact on their reproductive success, and that this effect may be more marked for females than for males. I manipulated the food available to domesticated breeding zebra finches to test Trivers & Willard's (1973, *Science*, 179,90-92) hypothesis of adaptive sexual investment. When food availability was restricted, clutch sex ratios were significantly more male biased than when food was available in excess. Within clutches, daughters hatched sooner than sons and first-hatched chicks fledged at higher weights than those that hatched last. Chick mortality was female biased when food availability was low but male biased when food availability was unrestricted. I compared the song output of brothers of differing weight at independence, but found no significant difference between them. These data suggest that zebra finches manipulate both their

primary and secondary sex ratios in relation to food availability to invest adaptively in sons and daughters, and support Trivers & Willard's hypothesis. Copyright 1998, The Association for the Study of Animal Behavior.

I get more males when the weather conditions are good and I get more hens when things are colder or wetter. I read somewhere that in the wild the male/female ratio is based on how harsh the conditions are. If times are bad, more hens are born to create more babies.

Andy, are your results across the board, regardless of hen? It seems to me that everyone else is reporting the opposite results - more males in colder/harsher season, more hens in spring/summer.

There is also an on-going line of thinking and study into the ability of the parents to manipulate the sexes based on a number of things, including the attractiveness of either of the parents, numbers in the flock, etc. Whether this is done prior to the egg being laid or after the chick is in development (and possibly hatched) is also part of on going studies.

Temperature shouldn't have much to do with it -- it is usually resource availability (or lack thereof) that is the definition of a harsh environment. When times are bad, males are often more likely to be reproductively successful, because they can increase their reproductive output by mating with many females. Females can mate with all the males they want, but their output is limited to their own ability to bear/rear eggs/young. So the theory goes that harsh times should favor males and good times favor females (or at least be more even). Usually good/bad means the amount of food available (the parents have to have some environmental trigger that starts this process in motion). Lots of work is being done to show these processes occurring in mammals and birds, but the evidence is still fairly sparse as far as I know. And there are all kinds of species-specific things that could interfere with this simple prediction. For example, if female offspring stick around and help with the rearing of the next brood, then harsh times should favor females in that species. This certainly could apply to many of our finches. In some species, males disperse more widely after weaning, so you would want more males during harsh times because they don't compete with you for food and you can use that food to rear more offspring. So you really have to know a lot about the species' natural history and mating system just to make reasonable guesses about what should happen. Then you have to suppose that there is some biological mechanism in place for this to actually occur. It all seems a little iffy to me when it comes to passerine birds, but it definitely occurs in nature and could happen.

I use to get more female goulds, and red head parrot finches during the winter months, and more males in spring. Some times 3-1. Since I moved, it has been about even.

I guess I'm assuming that (1) the birds' biology hasn't changed overnight just because they're in a cage and (2) what people feed their birds actually isn't the

same all year long. E.g., what if you don't feed much egg/live food (or the birds don't eat it) in the month prior to breeding? Maybe the amt of animal protein (like some specific amino acid) is the biological trigger that tells the birds this is "good times" or bad. Mostly seed diet might indicate bad times and lead to a preponderance of males.

I've heard various theories about sex ratios, from UV light exposure to genetic predisposition of the parents. I wish I knew what it is, because I get twice as many girls as boys...which makes selling pairs a problem. If there is a temperature factor, it's not the same mechanism that the reptiles employ. They use something called temperature sex determination.. Those animals don't have sex chromosomes. Heat and humidity determine which sex organs develop in the embryos. Birds have sex chromosomes (that's why we can DNA sex them, and can't do that with most turtles/tortoises and some lizards), and their sex depends on what chromosomes they inherit from their parents. In my case, I'm inclined to believe the UV light theory, since my birds get lots of unfiltered sunshine in the warmer months, and are supplemented with full spectrum plus UV lighting year long. Of course, if it's genetic, then I've selected for female heavy producers over the years. Either way, I'd like to get some more males, and I don't think that's going to happen any time soon!

I have been breeding inside my garage for the last 5 months, and I am now getting almost that same ratio of males to females. No UV light.

I've heard of the UV light being the influence, but according to what I was told and have read, if the birds are breeding in outdoor, UV light from sunshine, the sex ratio should be equal. When bred indoors, you will get more males. Since your situation is different, the theory you mention about genetic predisposition of the parents is one that I have heard from several canary breeders. They feel that it is the hen that is the culprit in producing more hens. Since male canaries that will sing is what they are wanting to produce more of, they don't want to breed with hens that are heavy producers of females because they swear that all the hens from those pairings will also be heavy producers of females.

When my birds were housed outdoors, I always got more hens from the pairs breeding while the weather was warm to hot in the late summer. As the breeding season went into the fall and winter, the sex ratio reversed to many more males. I too believe that this is a throwback to the reptiles from which birds supposedly descended. I was told that the eggs in turtle nests are more male hatches lower in the nest, therefore cooler, and more female hatches in the upper nest, therefore the hotter area. Don't know if that is true or not, but it did agree with my bird ratios.

Regarding gender of chicks produced: I suspect that over time we get 50% of each. Some years are heavy in one direction, others in another.

I've observed sex ratio variation with many different species of finch, hookbill and softbill. Based on my observations in hookbills, this phenomena seems more distinct in "less evolved" species of parrots. I've also noted this with Hornbills, which are a truly ancient species

My summer/winter sex ratios with Gouldians (especially) always seemed to swing heavily male to female and back.

Some interesting new research on maternal hormones and offspring sex ratio in birds (coturnix quail): If you want more females, add some stress!

Pike, T. W., & Petrie, M. (2006). Experimental evidence that corticosterone affects offspring sex ratios in quail. *Proceedings the Royal Society, Series B: Biological Sciences*, 273, 1093-1098.

Recent studies have shown that some species of birds have a remarkable degree of control over the sex ratio of offspring they produce. However, the mechanism by which they achieve this feat is unknown. Hormones circulating in the breeding female are particularly sensitive to environmental perturbations, and so could provide a mechanism for her to bias the sex ratio of her offspring in favor of the sex that would derive greatest benefit from the prevailing environmental conditions. Here, we present details of an experiment in which we manipulated levels of testosterone, 17 β -oestradiol and corticosterone in breeding female Japanese quail (*Coturnix coturnix japonica*) using Silastic implants and looked for effects on the sex ratio of offspring produced. Offspring sex ratio in this species was significantly correlated with faecal concentrations of the principal avian stress hormone, corticosterone, and artificially elevated levels of corticosterone resulted in significantly female-biased sex ratios at laying. Varying testosterone and 17 β -oestradiol had no effect on sex ratio alone, and faecal levels of these hormones did not vary in response to corticosterone. Our results suggest that corticosterone may be part of the sex-biasing process in birds.

I've used black lights off and on for the past 4 years; two 18" lights in the bird room. The first year, I had at least twice as many hens as cocks hatched out (gouldians). So much so that I shut off the black lighting for six months. Started it up again but have not noticed these same results. However, I have changed my birdroom around. I still only have 2 black lights set up.

I have a friend who has six 18" black lights set up on the tops of his cages. These are within six inches of his nest baskets and are on 24/7. He too has gouldians. His ratio of hens to cocks is VERY high; in fact, it is rare for him to get a cock. His belief is that this works but only with a number of black lights that are positioned close to the birds/nest boxes.

Adding black lights (2) in the bird room worked for me, at least with gouldians. Went from a 2 to 1 ratio of cocks to hens to the opposite after hanging these. Shut them off, went back to the original ratio. They are back on and so far, the juveniles that are coloring out are evenly matched in cocks to hens. Coincidence? Maybe. Black lights are cheap to purchase.

You can read about that work of Robert Black's in his article posted on http://www.ladygouldianfinch.com/features_lighting.mgi He found that ultraviolet light affected male/female ratios by installing a black light in his bird room. That

convinced him of the need for full spectrum light. I, myself, have not experimented with it. It would be interesting to hear from those who might have.

It may have to do with the time of year they are bred in. More males in spring to summer, more females in fall - winter. Possibly cocks earlier rounds, hens later rounds. I cannot say as such with great force because of my limited experience, but the "cocks earlier, hens later" sex ratio findings were said as such by Jim W of England (a very respected lonchura breeder).

Before my cages were lighted above, there was only incandescent light in the birdroom. At the time I only had 2 pr. societies and 1 pr. zebras. The ratio of cocks to hens was about 3:1 over about 10 clutches, all told.

I mean to say that if the sex ratios are determined based on season, and the season depends on lighting, then yes, lighting relates to sex ratios. But as far as determining whether it was a different type of light (i.e. blacklight) there was no discussion on that as a determining factor. I have my journals records on breeding my gouldians back to 1971. Unfortunately, one thing I didn't record was what the sex produced was for different times of the year. I only did a year-end total. As for lighting affecting the sex ratio, I have had my goulds in sunny porches then in basements with just incandescent lighting and now in 3 bird rooms (out buildings) with regular florescent lightning. no black lights or broad spectrum lights. The ratio of males to females is almost a perfect 50/50 over the last 32 years. (This is from a low of the 3 pairs I started with to the 38 pairs I use now with various numbers in between). I also have records in 10-year groups. Although there are swings in the ratios, each 10 year period seemed to average out at almost 50/50 with males usually having a 1-3 point advantage. (My biggest ratio swing was 80% females to 20% males. this was a year where I replaced a lot of pairs with first time pairs) my birds have one season here. The temp is the same (except on really hot days when I cant get the temp below 85-88) and the lightning is a constant 16 hours, except for the odd times when I have to reset the light timers due to power outages. As for blacklights, i can't comment on whether or not they actually change the sex ratio or if it's a random thing...can only comment on my 50/50 ratio.

So the belief was more females are produced as the days shorten, more males as the day lengthens.

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