Iron Storage Disease Alert

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In recent years there has been evidence linking increasing numbers of the alarmingly frequent cases of early mortality in captive toucans and toucan-like birds with a condition known as **Iron Storage Disease,** or Hemochromatosis. In most cases, the disease has no outward symptoms until an affected bird collapses and almost always dies shortly thereafter. For too many birds, life is being cut short to a fraction of the expected longevity.

Necropsies have revealed severe damage to the liver and certain other internal organs associated with an excess buildup of iron in the affected bird. Because the onset of symptoms usually comes only after critical degeneration of the organs, there may be little chance of developing a successful treatment.

The excess buildup of iron which causes the disease may be due to excess dietary iron or to other physiological conditions which make the birds unable to handle what might ordinarily be safe levels of dietary iron. Until the exact cause can be pinpointed, the best strategy for keepers of toucans is to limit iron intake. Iron is an essential mineral, necessary for the production of red blood cells. Two big questions, still unanswered, are: How much iron do toucans *need* and how much iron is *too much* iron? Still, the risk to life from Iron Storage Disease is much greater than the risk from the unlikely occurrence of iron deficiency (which, incidentally, *is* treatable.)

Almost all foods contain lesser or greater amounts of iron, so an iron-free diet would be not only inadvisable, but impractical. In older natural history books, toucans are described as fruit eating birds. Indeed, the majority of their diet *is* fruit. It is probably thanks to more patient field naturalists that we have learned that they also take some portion of meat in the wild, including bird eggs and nestlings, and reputedly even fish. Still, there is a lot more we don't know about the natural balanced diets of these birds. However, we do know that meat protein sources are also natural sources of iron.

Many people have advised the use of mynah bird pellets, monkey biscuits or dry dog foods as good protein and mineral sources for toucan diets. Most of these foods have been supplemented with iron above and beyond the iron present in the meat products used in their formulations. Commonly, this iron is listed among the ingredients in one of numerous forms, including ferrous (iron) sulfate, ferrous fumarate, and iron carbonate. Two recently published articles have quoted a figure suggesting that commercially available mynah pellets have unusually high levels of iron. In addition, the authors go on to recommend a particular brand of dry dog food as a substitute. In recently conducted independent tests, two leading brands of mynah pellets were found to contain iron at levels very similar to the recommended brand of dry dog food, and actually lower than some other brands of dry dog food that were also tested. These findings suggest that insofar as iron content is concerned, dog food is no better than mynah pellets. In addition, shellfish, red meat, bone and liver are naturally high in iron; while fish meat, light meat poultry and especially milk products are relatively low in iron. Green, leafy vegetables are generally quite high in iron.

Until a truly balanced and healthy diet can be discovered, we recommend a diet consisting mostly of fruits. Some non-leaf type vegetables (for example: peas, carrots, and corn kernels) may also be included. Lastly, include limited amounts of animal protein sources (more in breeding and nestling birds). Protein sources naturally low in iron and without fortified iron are preferable. There are some brands of mineral and vitamin supplements without any

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iron in their formulations which may be used.

This article is meant as an alert to make more people, specifically toucan keepers, aware of a very real bird health problem. We hope that an "iron consciousness" or "think iron" approach will develop among people, and that our birds will live fuller lives as a result.

Readers are encouraged to send lists of the foods in the diets of toucans and related birds (or mynahs) which have succumbed to Iron Storage Disease or an unspecified "liver disease", as well as the diets used by anyone who has successfully kept the larger toucans alive and healthy for 15 years or more. Please send any information to: Jeff Kassel, 4353 Hardwood St., Fremont, CA 94538.

Additional Note: In the time since this article was composed, a column has been published in *Bird Talk* magazine (August, 1988 issue) discussing Iron Storage Disease.

Some brief personal comments:

The theories concerning the origin of this condition were very interesting, and the column informative in this regard.

I don't feel a sufficient alert was made, especially to private keepers of softbills, who lack the knowledge and resources of zoological institutions.

The point about the possible influence of acid foods in gastrointestinal uptake of iron was potentially very useful in designing diets. Briefly, as a precaution, acid foods should not be fed on the same days that iron-rich foods are fed. This practice should be coupled with an overall reduction of iron feeding.

The column includes a list of acid-rich and iron-rich foods, presumably intended as a guide for softbill keepers. I have done limited research of my own on the iron content of foods, based on a U.S.Dept. of Agriculture publication. My findings (table enclosed) are in disagreement on some of the listed items. Of course, our definitions of "iron-rich" may be different. Also, because of its incompleteness, the *Bird Talk* list may potentially misguide people: "Then, is everything *not* on the list okay for my birds?"

I applaud this increased publicity for Iron Storage Disease by *Bird Talk*. Still, I would like to see some consistent, accessible guidelines for those of us trying to keep softbills alive until such time as a scientific explanation for the disease can be provided.

Sincerely, Jeff Kassel ●

Iron and Protein Content of Selected Foods

(Source: U.S.D.A. Publ. #456, 11/75)

Food	Raw or Cooked	% Water	Iron, mg/kg Wet Weight	Iron, mg/kg Dry Weight	% Protein Dry Weight
Shad	C	64.0	5.9	16.5	64.4
Halibut	C	66.6	7.9	23.7	75.4
Cod	C	64.6	9.9	28.0	80.5
Flounder	C	58.1	14.1	33.6	71.5
Haddock	C	66.3	11.9	35.3	58.1
Shrimp	C	56.9	20.0	46.5	47.1
Scallops	C	73.1	30.0	111.4	86.1
Clam	R	79.8	74.9	370.7	54.8
Papaya	R	88.7	2.0	17.5	3.5
Pear	R	83.2	3.1	18.4	4.2
Apple	R	84.4	3.1	19.8	1.3
Grape, Thompson seedless	R	81.4	3.8	20.2	3.4
Cherry	R	80.4	4.0	20.2	6.6
Plum	R	78.7	5.1	23.8	3.7
Cantaloupe	R	91.2	2.3	26.2	4.5
Fig	R	77.5	6.0	26.7	5.3
Banana	R	75.7	7.0	29.0	4.5
Pineapple	R	85.3	5.1	34.5	2.7
Coconut	R	50.9	17.0	34.5	7.1
Date	R	22.5	30.0	38.7	2.8
Cranberry	R	87.9	4.8	40.0	3.1
Orange	R	82.3	8.2	46.5	7.3
Raspberry	R	84.2	9.0	57.2	7.5
Blueberry	R	83.2	9.9	59.0	4.2
Tomato	R	93.5	4.6	71.2	15.2
Strawberry	R	89.9	9.9	98.1	7.0
Boysenberry	R	86.8	16.1	121.8	9.0
Brown Rice	R	12.0	16.1	18.3	8.5
Peanut Meat	C	1.8	22.2	22.6	26.7
Corn, Frozen	R	76.2	7.9	33.3	13.0
Wheat, Whole	R	10.4	36.8	41.1	15.1
Peas, Dry	R	11.7	50.9	57.6	27.3
Lentil	R	11.1	67.9	76.4	27.8
Soybean	R	10.0	83.9	93.2	37.9
Tofu	R	84.8	18.9	124.6	51.3
Milk, Nonfat Dry	R	3.0	5.9	6.1	37.0
Light Turkey	C	62.1	11.9	31.4	86.7
Light Chicken	C	63.8	13.0	35.9	87.2
Rabbit	C	59.8	15.0	37.3	72.8
Dark Chicken	C	64.4	17.0	47.6	78.6
Beef Sirloin	R	55.7	24.9	56.2	60.2
Dark Turkey	C	60.5	22.9	58.0	75.9
Veal Chuck	R	70.0	23.1	77.1	51.7
Egg	R	73.7	21.1	80.0	43.4
Heart, Beef	C	61.3	59.0	152.5	80.8
Liver, Beef	C	56.0	87.9	199.7	60.0
Sweet Potato	R	70.6	7.0	24.0	5.8
Avocado	R	78.0	6.0	27.3	6.1
Carrot	R	88.2	7.0	59.7	9.3
Mushroom	R	90.4	7.9	82.6	28.0
Broccoli	R	89.1	11.0	101.0	32.9
Iceberg Lettuce	R	95.5	5.1	112.6	20.1
Romaine Lettuce	R	94.0	14.1	234.9	21.7
Spinach	R	90.7	31.1	333.9	34.3
Boston Lettuce	R	95.1	20.0	409.1	24.3

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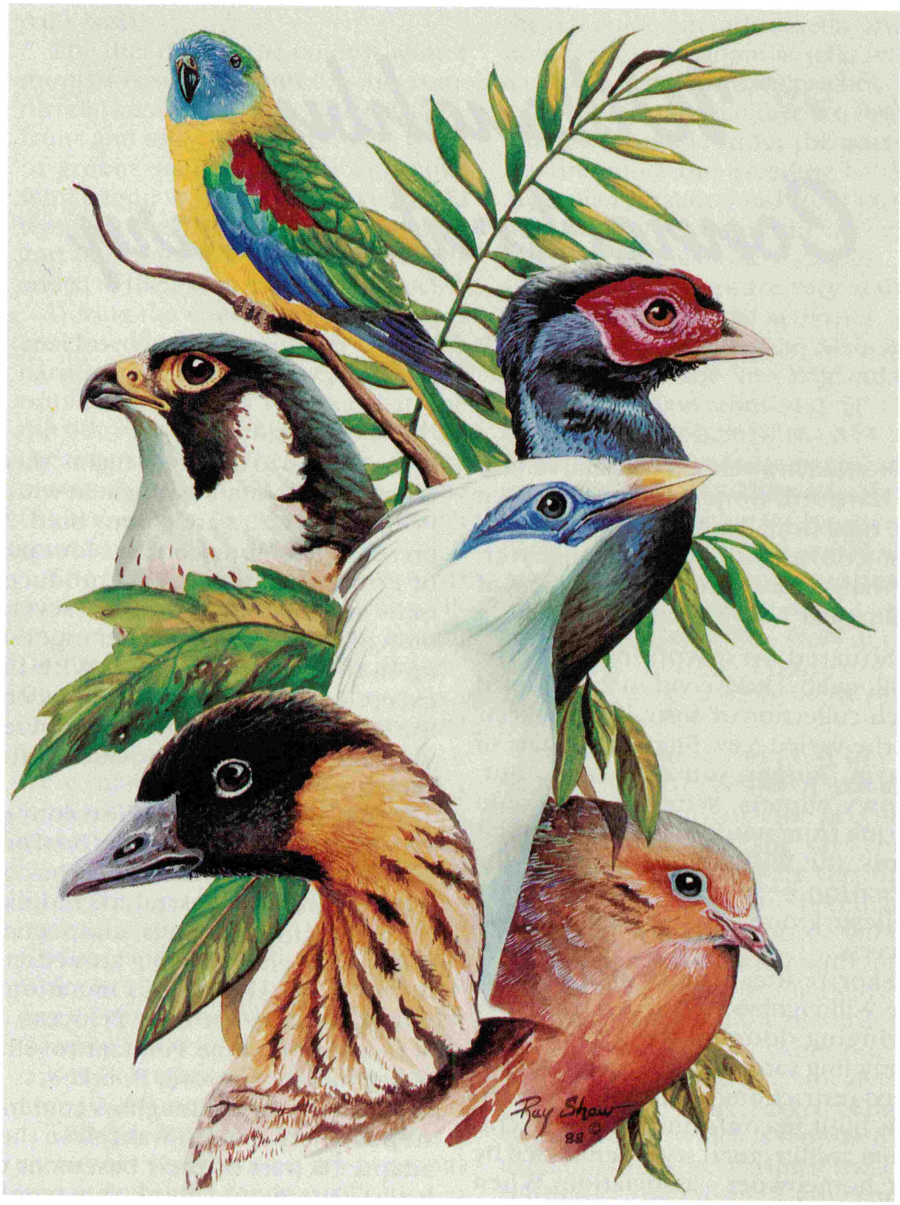

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