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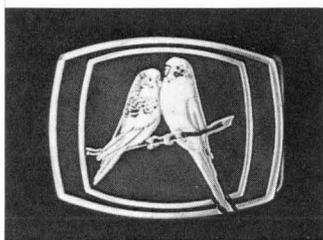
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Water is seldom listed among the nutritional requirements of living things, but this substance is the most basic of all needs in nutrition. There are life forms that live without air or oxygen, but none can live without water. Though water is so often taken for granted, it is the most essential nutrient and the first requirement for life. The turnover and exchange of water in the body exceeds that of any other nutrient. A 10% reduction in body content of any other nutrient usually will cause no noticeable effect, but a 10% reduction in water in the form of body fluids will cause symptoms of severe dehydration. A 20% reduction in body fluids is fatal.

Birds and other animals have three primary sources of water. First, the actual drinking of water is the main source. A number of factors may affect this source of water for cage birds. The growth of bacteria may make it unpalatable; birds frequently will refuse to drink warm water: Cool, clean water is a necessity for avian nutrition. At times, outside water sources for birds, such as a continually dripping faucet, may harbor the growth of algae. These are tiny, green, one-celled plants that are harmless to the birds and are actually an excellent nutritional addition to the diet, if eaten. Algae are nothing to be concerned about, since they grow profusely in any natural water source.

The second main water source is the bird's food itself, since food contains a considerable quantity of water. Vegetables, of course, have the highest percentage of water. Tomatoes contain about 94% water and cucumbers are 96% water. Carrots and onions contain 88%; bananas and sweet corn are relatively low in water among the fruits and vegetables, with a 76% water content. Spinach greens are about 90% water; kale has a water content of about 87%. Nuts and grains contain far less water. Cereal grains range from 11% to 13% water, with a content in millet of about 12%. The oily seeds and nuts contain the least water of any food items, usually a maximum of about 5% in such items as safflower seed, sunflower seed, and almonds. Walnuts, peanuts, and pecans contain even less water. You may have wondered why nuts make you thirsty, even when they're raw and unsalted: Their low water content is the reason. It also follows that nuts are your best nutritional buy, since the water content in them is so small and the other nutritional contents so high. As you

water in cage bird nutrition

by Robert G. Black, Franklin, North Carolina

(This article is taken from the book, "Nutrition of Finches and Other Cage Birds," published in June, 1981.)

might suspect, a whole egg, even hard boiled, is an average 74% water, though some will test at about 65% water content.

The third source of water for the body is the internal metabolism. As proteins, fats, and carbohydrates are metabolized to produce energy, water is created as a by-product. For example, about one pound of water will be formed as one pound of fat is metabolized. Obviously, in comparison to the body's needs, this is not a large amount, and this water source is minor in the life of most birds and animals. In some desert creatures, such as the kangaroo rat for example, this can be a very significant part of the body's needs for moisture. Budgerigars, the common grass parakeets so familiar as pets, can go for an incredible length of time without water. In proven tests, they have lived in perfect health for periods of 120 days — four months — without a drop of water. Their sole water sources were the small content in their feed and the by-products of their heat and energy production. Obviously, the budgerigar has a very well-developed internal system for water conservation, one perfectly adapted for desert life.

The amount of water in organism's bodies may vary considerably at different times, even within the same species. Chicks one week old may have a body water content of 85%, while that gradually decreases to 55% at maturity. The percent of body water is closely related to the fat content of the body. The more fat stored within the body, the less will be the percentage of water content. This is why the normal variation from 50% to 75% water content in humans can be so large. The average water content of the human body is about 60%.

Two thirds of the body water is within the cells. Blood is 80% water, but this is less than 8% of the total water content of the body. The kidneys are very efficient in conserving water, and they will absorb enough water routinely to maintain blood volume at a normal level. The water content of a bird's droppings varies a great deal, even within different strains of the same species. Fifty to seventy percent seems normal for chickens, and similar proportions can be expected in cage birds. Birds with very firm droppings, such as budgerigars, probably have less than 50% water content. Under conditions of starvation, a bird can use up almost all of its glycogen (stored carbohydrate) and fat reserves, half of its protein, and 40% of its

total body weight and still live. However, the loss of only 20% of the water content of the body will kill the bird.

A bird will never voluntarily consume an excessive amount of water, since the body's needs are very closely controlled by factors that are not yet completely clear. The water consumed is absorbed very rapidly, and it is lost through the kidneys and through evaporation in breathing. Water performs a very important function for the body in the regulation of body temperature, since water evaporation removes excess heat. Whenever the body begins to overheat, the bird will begin to pant. This evaporates far more moisture and results in greater cooling. Humans accomplish the same cooling effect through sweating when the body becomes overheated. The evaporation of one gram of sweat will dissipate 540 calories of heat. The panting of birds and the higher water evaporation at higher temperatures greatly increase the need for water. The difference in temperature from 70 degrees to 90 degrees Fahrenheit may increase water consumption by 100%.

Water serves several other functions in the body. In its most important function, it acts as a solvent and carrier for body nutrients, including the monosaccharides, amino acids, phospholipids, vitamins, and minerals. These items are all vital to life. Water also carries the hormones and enzymes necessary for the proper functioning of every cell in the body. Water further serves as a lubricant, especially in the joints, and acts as the medium for many metabolic reactions.

Water carries a variety of other substances in solution that are completely invisible even under a microscope. These are dissolved minerals and compounds that the water picks up as it flows and exists in liquid form. Rain water will pick up minerals and oxygen as it falls through the air. Unfortunately, minerals absorbed in this way are often the poisonous pollutants, such as lead, or compounds, such as sulfuric acid. Ground water will absorb minerals wherever it flows, and this content is often a substantial source of minerals in the diet. Two minerals commonly found in water are chlorine from water treatment and iron from ground deposits. Both of these will destroy vitamin E on contact. Make every effort to exclude them from your birds' water supply.

Water is also the carrier of the waste products of the cells. These include carbon dioxide, nitrogen compounds from

the breakdown of proteins, and other compounds that are poisonous or in excess to the body's needs. These waste products are carried to the lungs and kidneys for excretion. Some also go to the liver where they are incorporated into the bile for excretion into the intestinal tract.

The most obvious symptom of a water deficiency in finches and cage birds is squinting. This characteristic seems to be specific for dehydration. The only other time you will notice this is if something is sprayed or placed directly into the bird's eyes. Squinting is a red flag of warning, and I cannot count the number of times birds have warned me of a water problem by this characteristic physical reaction. Normally, a bird without water for 24 hours or less will begin squinting, and this symptom is obvious at a glance from several feet away. More severe dehydration and death are just a step away from the act of squinting.

Only once has squinting not developed within 24 hours of water deprivation in my experience. In an act of sheer stupidity, I moved several finches to a new cage with all food items, but neglected to give them any water. It was 48 hours before I discovered this error, yet the birds still were not squinting, and they showed no sign of dehydration. Of course, they were down at the water as soon as it was placed in the cage. They were thirsty, but obviously were not suffering from lack of water. I can only attribute this to the fact that the temperature was cool during this period and stayed at about 55° Fahrenheit (13° C.). This apparently enabled the finches to conserve their water reserves very efficiently. During hot weather, such an extended period without water probably would have resulted in death.

The body contains far more water than any other substance. There is no substitute for water in the body's metabolism, and I cannot overstress the importance of a continuous water supply for the birds. If an emergency should occur that does not leave any time for bird care temporarily, make sure the birds have water along with some basic food item, such as millet for finches. All else can wait in an emergency. You can check a hundred cages for water and millet in five minutes, and a few days of such limited nutrition will not hurt healthy adult birds in the least •

Robert G. Black is an aviculturist with extensive experience in the breeding of finches and doves. He has also written a booklet on the use of fostering techniques in breeding, and a book on problems encountered in breeding finches.



October 3rd, 1981
Boston Society for Aviculture, Inc.
 presents its
Annual Bird Show
 at the
 Weston Town Hall
 Town House Rd., Weston, MA
 (Rt 128, exit 49)

Judges:
 Parrots and Displays—Tom Ireland
 Finches and Softbills—Clark Spencer
 Cockatiels (A.C.S. regional)—
 Nancy Reed
 Type Canaries—Manny Silva
 Colorbred Canaries—Danny Kaye
 American & Variety Singers—
 Russell Gallini
 Budgerigars—Don Langell
 American Budgies—Linda Rubin
 For information contact:
 Jon Hoffman, 7 Mount Hood Rd. #B
 Brookline, MA 02146
 phone (617) 739-6555

October 16, 17, 18, 1981
The Buffalo Canary and
Budgerigar Club
 presents their
45th All Bird Show
 Judges:

Budgerigars—Corienne Traver
 Color bred canaries—Gino Abbate, Jr.
 Type canaries—Robert Ross
 Wild birds and Hook bills—
 Fitzroy Hookumchand
 For information contact:
 Conrad Menclawicz
 23rd Erb Street
 Buffalo, N.Y. 14211

October 16, 17, 18, 1981
Aviary Association of Kern
 presents its
7th Annual Bird Show
 for Budgies, Hookbills, Finches,
 and other exotics
 at the Kern County Fair Grounds
 Hall of Flowers
 1142 South P Street
 Bakersfield, CA
 Contact: Bill Novickas
 (805) 589-2081

October 17th, 1981
Maryland Cage Bird Association
 will hold its
6th Annual Open Bird Show
 at the
 Ramada Inn, 1701 Belmont Ave.
 Baltimore, Maryland 21207
 For information contact:
 Margaret K. Vogel
 4010 4th St., Baltimore, MD 21225
 phone (301) 355-6304

October 3rd, 1981
Smokey Mtn. Cage Bird Society
 presents its
2nd Annual Bird Show
 For information contact:
 Show chairman, John Gibbs
 Rt. 2, Box 19
 Weaverville, NC 28787

October 17, 1981
10th Annual Open Breeders Show
Sunshine State Cage Bird Society
 Court of Flags Resort
 Orlando, Florida
 Judges:
 Type & American Singers—John
 Bassett, Jr.
 Red Factors—Baldomero Hernandez
 Exotics—Tom Ireland
 Budgies—Bob Howard
 Cockatiels—Nellie Herry
 Finches—Juanita McLain
 For information contact:
 Lunda J. Bennett, Show Secretary
 130 Sunset Drive
 Longwood, Florida 32750

October 24, 25, 1981
Capitol City Bird Society
 of Sacramento
 presents their
5th Annual Bird Exhibition
 to be held at
 Rusch Park Community Center
 Carmichael, California
 Judges:
 Budgerigars—John De Victoria
 Canaries, red factor—Frank Crane
 Canaries, type—Scotty McNiff
 Hookbills & parrots—Hank Johnson
 Finches—to be announced
 For information contact:
 Capitol City Bird Society
 Gwen Worman
 3840 Lankershim Way
 North Highlands, Ca. 95660
 (916) 334-9256

October 30, 31, November 1, 1981
18th Annual Show
 will be presented by the
Fresno Canary and Finch Club
 at the Hacienda Inn
 Clinton and Highway 99
 Fresno, California
 Judges:
 Color bred—Scott Richie
 Type—Greg Farina
 Finches—Joe Krader
 Hook bills—Mike Cunningham
 Budgies—Hugh Wilson
 (sorry, no ship-ins)
 Show secretary: Hazel Espindula
 1633 W. Zumwalt, Tulare, CA 93274

October 30, 31, 1981
The Greater Omaha Cage Bird Society
 presents their
All Bird Show
 to be held at the
 Village Inn Motel
 2216 27th Ave.
 Council Bluffs, Iowa
 Judges:
 Canaries—Harold Sodamann
 Budgerigars—Crawford Maddux
 Hookbills—Ralph Bowman
 Foreign Birds—Paul Williams
 American budgies—Ralph Bowman
 For further information contact:
 Diana Humanik
 1211 N. 146 Plaza
 Omaha, Ne. 68154

October 31, November 1, 1981
California Game Bird Breeders
Association, Inc.
 presents their
Annual Show
 at the
 Pomona Fair Grounds, Bldg. #8
 Pomona, CA
 The largest game bird show of
 its kind in the U.S.
 Free admission, public invited.
 Doors open:
 Sat. 1 p.m. to 5 p.m.
 Sun. 10 a.m. to 3 p.m.
 For information contact:
 Show chairman, Gene Daniels
 (213) 860-8673

October 30, 31, 1981
Gold Coast National Exotic
Bird Show
 hosted by the
Gold Coast Exotic Bird Club, Inc.
 featuring the
 ABS District 5 Regional Show
 on the ocean at the
 Konover Hotel
 Collins Ave, Miami Beach, FL
 for reservations call (800) 327-0555
 Judges:
 Budgies—Betty Lou Morrow
 Canaries, type—Paul Dee
 Canaries, color—Sig Larson
 Cockatiels—Harold Bowles
 Finches—Robert Black
 Hookbills—Roger Kenny
 Open show, everyone welcome
 Show chairman: Larry McPhail
 P.O. Box 15056, Plantation, FL 33318
 (305) 733-8158

November 1, 1981
Pet Bird Show
 and **Pet Fair**
 hosted by the
Gold Coast Exotic Bird Club, Inc.
 (following the Gold Coast National
 Exotic Bird Show) at the
 Konover Hotel, Collins Ave.
 Miami Beach, FL
 Awards, luncheon, exhibits, sales,
 seminars and many surprises!
 Open to the public

November 6, 7, 1981
Annual Open Bird Show
presented by the
Missouri Cage Bird Association
at the
Noah's Ark Motor Inn
1500 So. Fifth St.
St. Charles, MO 63301
Contact show secretary:
Eileen Karius, 1111 Dover Place
St. Louis, MO 63111
Judges:
Color bred—Harry Knapp
Type—Harold Sodamann
American singers—John Schaefer
Budgerigars—Russ Roberts
Finches, Wildbirds, Hook bills,
Exotics—Charles Anchor

November 6, 7, 8, 1981
American Canary Fanciers Association
presents its
2nd Annual All Canary Show
at the Hacienda Hotel
near the Los Angeles airport
Judges:
Melanin—Debbie Blackwell
Lipochromes—Ignacio Perea
Type—Donald Perez
for information contact:
Ramon Lamelas, 6915 King
Bell, CA 90201
phone—(213) 562-0883

November 6, 7, 1981
Greater Chicago Cage Bird Club, Inc.
presents its
49th Annual Bird Exhibition
at the Northlake Hotel
401 W. Lake St., Northlake, IL
Judges:
American Singers—Ethel Keizer
Types—Bernard Lince, England
Cockatiels—Ralph Bowman
Hookbills—Dr. Al Decoteau
Budgies—Walter Loepke
Exotics—Evert Gerritsen
Colorbred Hartz, color fancy—
Jerry Butkus
For information contact show
secretary:
LaVern Krauss,
2719 So. Komensky Ave., Chicago, IL
60623

November 7, 8, 1981
Southern Oregon Game and Cage Bird
Breeders
hosts an
All Bird Show
to be held in
Grants Pass, Oregon
Contact:
Kurt Dahl (503) 476-5904
10562 Lower River Road
Grants Pass, Oregon 97526

November 7, 8, 1981
Rocky Mountain Society of Aviculture
Annual Bird Show
to be held at
North Valley Center
84th & Valley Highway
Denver, Colorado
Judges:
Colorbred—Otto Manke
Type—Clarence King
Parakeets, finches, hookbills—
Ray Johnson
Contact:
Kevin Wirick
748 Santa Fe Dr.
Denver, Colorado 80204

November 7th, 1981
Greater Pittsburgh Cage Bird Society
presents their
7th Annual All Bird Show
to be held at the
Ramada Inn North
Route 8, Allison Park, PA
Judges:
Type canaries—Carl Welsch
Color bred canaries—Bill Henderson
American singer canaries—
Bill Hardingham
English budgies—Dan Gallo
Foreign birds and American budgies—
Dr. Val Clear
For information contact show
secretary: Sara Prince
107 Richard Dr.
Glenshaw, PA 15116

November 7th, 1981
Annual Georgia Cage Bird Show
hosted by the
Georgia Cage Bird Society
at the Hyatt Riveria Hotel
1630 Peachtree St.
N.W. Atlanta, GA
Contact: Mimi Shephard
164 Park Drive, Decatur, GA 30030
(404) 875-9711
Judges:
Cockatiels, Hookbills, Finches—
DeeDee Squyres
Canaries—David Guinn
Budgies—Charles Schaeffer

November 13, 14, 15, 1981
San Diego County Canary Club
presents its
16th Annual Show
this year for the first time
combined with the
San Diego County All Bird Breeders
Club
to be held at the
College Grove Shopping Center
Highway 94, San Diego, CA
Judges:
Bud Ricks and Randy Grisco
for information contact;
Janice Pritchard, 457 W. Douglas Ave.
El Cajon, CA 92020

November 19, 20, 21, 1981
4th National American
Cockatiel Society Show
held in conjunction with the
33rd National Cage Bird Show
Hilton Airport Plaza Inn
8801 N. W. 112th St.
Kansas City, Missouri 64195
ACS Panel Judge: Harold Bowles
For information contact:
Nancy A. Reed
55 Sunnyfield Dr.
Windsor, CT 06095

November 21, 22, 1981
Columbia Canary Club
presents its
Annual Canary Show
at the
Milwaukie Center, Milwaukie, Oregon
North Clackamas Park
Show secretary: Sally Moore
1760 19th St., N.E., Salem, OR 97303

November 28, 29, 1981
20th Annual Show
presented by
Santa Clara Valley Canary
and Exotic Bird Club
to be held at the
Marion A. Peterson School
1380 Rosalia Ave.
Sunnyvale, CA 95051
Judges:
Domestic canaries—Barbara Williams
Exotics—Paul Schneider
Type canaries—Sig Larson
Red factor canaries—Wilbur Tallman
Show secretary:
Delillah Quieto
1952 Beech St., Santa Clara, CA 95054

December 4, 5, 6, 1981
Orange County Bird Breeders
presents its
4th Annual Bird Show
at the
Orange County Fair Grounds
Costa Mesa, CA
Show secretary: Tommie Lilly
For information contact:
Joe Krader, P.O. Box 644
Garden Grove, CA 92642

December 12th, 1981
2nd Annual All-American Gloster Show
to be held in
St. Louis, Missouri
Judge: Mr. John Knipp
St. Louis Harley Hotel
Earth City, Missouri
Contact show secretary:
Eileen Karius, 1111 Dover Place
St. Louis, MO 63111