THE SONGBIRD

THE BIANNUAL NEWSLETTER OF THE NORTH AMERICAN SONGBIRD WORKING GROUP, AN INITIATIVE OF THE AZA PACCT TAG

FALL 2021

NASWG
NORTH AMERICAN SONGBIRD WORKING GROUP

American redstart (Setophaga ruticilla) by Eric Peterson

IN THIS ISSUE

Ambassador Animal Training with a Yellow-billed Cuckoo 2

Is the Secret to Saving Migratory Birds in the Meal Prep? 3

Songbirds, NASWG, and SAFE, oh my! 5

Recipe for Passerine-Approved Popsicles 6

New Species Fact Sheets 7

NASWG Team and Contact Info 16

Message from Nikki Smith, Columbus Zoo and Aquarium

North American Songbird Working Group Chair

"This has been a challenging year for keepers and birds alike. Birds perished in large numbers from an undiagnosed illness in the Mid-Atlantic and parts of the Midwest while government protections are slowly being restored. Many of us have watched our colleagues leave the industry due to budget cuts at zoological parks, aquariums, aviaries and wildlife centers. We are at a time in the history of animals in human care that it is more important than ever to pass on what we know and what we are learning every day about the husbandry of North American songbirds. Migratory songbirds in human care still pose many questions that we as keepers can and should be documenting and answering before their numbers become critical. As I'm sure most of you are aware we are losing birds at an amazing rate, 3 billion since 1970 (https://www.3billionbirds.org/) alone. Mixed species opportunities (South American aviaries!), favorite nesting materials (did you know indigo buntings love paper towel strips?), novel feeding approaches- we want to hear from you! I sincerely hope our spring article finds us in more precedented times and I know we all are looking forward to getting back to normal, whatever that may be. I hope you enjoy our fall 2021 edition as we highlight all of the great work we are doing in zoos, aquariums and rehabilitation centers. Thank you to all who made this edition possible."

Ambassador Animal Training with a Yellow-billed Cuckoo

By Alice Agnew, Education Associate, and James Weinpress, Bird & Mammal Curator

The Virginia Living Museum

The Virginia Living Museum is an AZA-accredited zoo and aquarium in Newport News, Virginia focusing on the state's native species. While the Museum participates in several Species Survival Plans (SSPs), the majority of the animals viewable on exhibit are non-releasable rescues that have been rehabilitated in the state of Virginia. The same is true of the Museum's ambassador animals, including "Pip", a yellow-billed cuckoo *(Coccyzus americanus).* Pip was hatched in human care in spring 2011 at the Wildlife Center of Virginia in Waynesboro, Virginia and transferred to the Virginia Living Museum in 2011 as a permanent resident. Because he imprinted on humans at a young age, Pip has always been comfortable in close contact with staff, and readily accepts being hand fed.

The Museum's goal is for Pip to become part of the ambassador animal team and participate in educational programming on and off site. The yellow-billed cuckoo is not a common bird species found in human care and is therefore an important ambassador for educating the public on the species' natural history, behavior, and role in the Virginia ecosystem. Pip is a flighted bird, so safely presenting him to the public will require him to enter a clear carrier, outfitted with a perch and natural substrate materials.

To begin his formal training program, Pip was assigned a primary and secondary trainer who set goals and created a schedule to ensure he was consistently moving forward in his training. He was conditioned to a clicker bridge stimulus, and it was determined (rather quickly) that his strongest reinforcer was waxworms. His trainers work with him 6 days a week, with each session lasting approximately 5-10 minutes. Pip quickly learned to move towards a pointing finger target placed on a branch in his enclosure. He moved to the hand target throughout his enclosure, jumping from perch to perch in order to earn reinforcement. This has progressed to him voluntarily stepping up onto the fingers of his trainers and remaining there until being targeted back onto a branch. The team is currently training him to shift from his enclosure to a perch inside the carrier, so he can be desensitized to moving to new locations throughout the Museum. The education team is excited about Pip's progress and is eager to make entering the carrier a positive experience for him.

Staff members have also noticed that since beginning his training, Pip has become more engaged with people, and can be found closely watching their movement at the front of the exhibit, waiting for his session to begin. He has also become increasingly vocal, and has been recorded making vocalizations not heard prior to the start of his training program. Pip's curious demeanor and strong relationship with his trainers makes him an ideal ambassador for his species and all North American passerines. His participation in educational programming will play a key role in sparking conversations about conservation, our local ecosystem, and will help the public build empathy for native species.

Pip the cuckoo with his favorite training treat, a waxworm.

Pip the cuckoo perching on his trainer's hand.

Is The Secret to Saving Migratory Birds in the Meal Prep?

Smithsonian's National Zoo and Conservation Biology Institute

The Bird House team at the Smithsonian's National Zoo has many beaks to feed, including 23 species of migratory songbirds and shorebirds. But what happens when they are hungry to migrate and there's nowhere to go? Curator Sara Hallager and nutritionist Erin Kendrick share some of the valuable lessons they have learned from taking these marvelous migrators under their wing.

Come fall and spring, migratory songbirds and shorebirds are programmed to do two things: fly and eat. In preparing for the long journey ahead, these birds exhibit a normal behavior called "migratory restlessness." During this period, they don't sleep much at night. They eat more. They put on a lot of weight. They expend all that energy (and those extra calories) as they embark on their marvelous migrations.

But what happens when those birds cannot travel, say, because they are housed in a Zoo? Do they gorge themselves, even though they have nowhere to go? How do keepers and Zoo nutritionists help individual animals stay physically fit and healthy, even as their physiology changes naturally with the seasons?

The answer lies in the meal prep.

Before we get into the ins-and-outs of our birds' diets, let's look at how they eat in the wild.

Songbirds know it's time to migrate in the fall, when their food staples (like bugs and berries) decrease. In the spring, they get the urge to migrate back to their breeding grounds for one reason—insects—which provide essential protein to newly hatched chicks. There aren't enough insects in the tropics to feed both year-round residents and visitors, so migratory species return home in the spring. There, they find an abundance of food resources for themselves and their chicks—until the cycle begins again.

Like songbirds, shorebirds follow their prey: aquatic and terrestrial insects, crustaceans, mollusks and very small fish. Most insects are only on the menu during the Northern Hemisphere summers. To find food the rest of the year, shorebirds need to fly south.

Stopover points, including the Delaware Bay on the Eastern Shore, are critical to shorebirds' journeys. They fill up on fattening foods, such as nutrient-rich horseshoe crab eggs. Food is fuel. Without enough of it, a bird may leave the stopover point late and miss the opportunity to mate. They may find a mate, but lack the energy to breed. Or, they may die during the grueling journey.

Sanderling "Aldrin" is one of the shorebirds cared for by the Bird House team.

Migratory birds in human care do not have to worry about finding food like their wild counterparts do. However, our experience has shown us that these birds can gain (or lose) weight very quickly with the seasons, even if their diets remain the same. They appear to be hard-wired to do this.

Knowing that their weight fluctuates depending on the season, we use what we know about each species' food preferences, weight and physiology to make daily tweaks and seasonal adjustments to their diets. A species-appropriate, nutritionally balanced diet will support a migratory bird over its lifetime, through breeding, raising chicks, growth and eventually geriatric care. As such, we aim to keep them within the weight ranges that their wild counterparts exhibit.

During breeding season, songbirds' drive for insect consumption increases greatly. So, we increase the amount of insects we feed them, and decrease our plant-based offerings. Heading into winter, we do the opposite. Because there are naturally fewer insects, we feed—and the birds consume—more plant parts.

Shorebirds seem to have hearty appetites year-round. They receive pellets formulated for insectivorous animals as well as chopped shrimp, krill, mealworms crickets, clam meat, mussels and the occasional crab. It has been remarkable how well they have taken to their Zoo diets. Some birds even consumed pellets immediately upon arrival!

Is The Secret to Saving Migratory Birds in the Meal Prep?

Smithsonian's National Zoo and Conservation Biology Institute

You might be wondering: what would happen if we didn't make any seasonal adjustments to the birds' diets on a regular basis? Since our birds don't migrate, the enormous store of energy would lead to perpetually fat birds if they did not lose weight every year. This could lead to health issues, or even death.

For the first time in the Zoo's 131-year history, we welcomed song sparrow chicks this summer. Because our first-time dad couldn't quite get the hang of feeding duties, keepers stepped in to help mom feed their chicks.

Even with diet adjustments, some individual birds may hold onto the migratory weight longer than others. Some may lose weight more quickly than we would like. They key to keeping our birds healthy is adjusting the amount of food they receive on an as-needed basis to ensure they stay within a healthy range.

Through positive reinforcement training, Bird House keepers are able to regularly monitor our animals' weights. Keepers cue the birds to voluntarily "station" (stand still upon a scale) while they take note of their weights. If the birds choose to participate, they receive a favorite food item as a reward.

In addition to these weigh-ins, keepers and the nutritionist routinely monitor fat stores on the birds' bodies by looking under their feathers, a practice that helps us further assess their body condition and health. Sometimes, no matter how we adjust a bird's diet, he or she may not lose weight due to their programed physiology. In that scenario, it takes a lot of patience, observation and collaboration to ensure a bird isn't experiencing adverse effects from excess weight. Typically, though, a bird's weight will return to normal at the end of migration season.

While zoos and aquariums have successfully kept migratory songbirds and shorebirds for many years, our team is **taking it to the next level**. Understanding the relationship between migratory physiology and seasonal diets will only help us to understand these birds and their needs, both in the wild and in zoos.

With the Bird House under construction and our animals housed in temporary quarters, we are able to acutely monitor and fine-tune their needs. It is a luxury to have this mini research opportunity. Once construction is complete and our birds move into the large aviary, we will not be able to manage individuals in the same way. But, that's ok! We can apply what we have learned these past three years to the management of the larger aviary. (A subset of our songbirds will remain off-exhibit so we can continue our breeding and behavior research.)

This is a critical time in the history of North American songbird and shorebird conservation. As populations decline drastically in the wild, the possibility of bringing them into human care to save their species becomes more real. Rather than wait and see what fate holds for these magnificent migratory birds, the Smithsonian's National Zoo is proactively studying their nutritional needs and management while they are still common. We are just at the beginning of a long journey that will take decades to perfect. With the information we have already learned, though, we will be ready to take wild birds under our wing when the need arises.

This story appears in the December 2020 issue of National Zoo News (viewable here). In early 2022, the Smithsonian's National Zoo's historic 1928 Bird House will transform into a first-of-its-kind attraction that immerses visitors in the annual journeys of western hemisphere birds. ***Learn more about this exciting project!***

Songbirds, NASWG and SAFE oh my!

By Sara Hallager, Curator of Birds, Smithsonian's National Zoo and Conservation Biology Institute and

Mike Kreger, VP Conservation and Sustainability, Columbus Zoo and Aquarium

So much great work is happening for native songbirds. This newsletter is a testament to that! It's an exciting time for native songbirds and perhaps you are wondering what the difference is between the North American Songbird Working Group (NASWG) and the SAFE North American Songbird (SAFE NAS) program.

The NASWG is an initiative of the PaCCT (Passeriformes, Coliiformes, Caprimulgiformes and Trogoniformes) Taxonomic Advisory Group. The NASWG, chaired by Nikki Smith of Columbus Zoo, works to develop, understand, study and promote native songbird husbandry and management in zoos and aquariums.

black-and-white warbler (Mniotilta varia) by Eric Peterson

SAFE North American NAS, chaired by Sara Hallager (Smithsonian's National Zoo) and Dr. Mike Kreger (Columbus Zoo), works on promoting awareness of native songbirds through its seven initiatives, complimented by educational efforts directed at changing behavior to save songbirds:

1. Reducing bird collisions with glass
2. Reducing free-roaming cat impacts on wildlife
3. Preserving, enhancing, and building native habitats
4. Reducing contaminants that affect North American songbirds
5. Promoting Bird Friendly® coffee
6. Promoting and participating in citizen science
7. Reducing North American songbird trafficking

chestnut-sided warbler (Setophaga pensylvanica)
by Eric Peterson

The SAFE NAS is proud to have been born out of the NASWG in 2019 when it was recognized that the NASWG should return to its roots of native songbird husbandry and a SAFE program should be developed to address the conservation challenges facing songbirds.

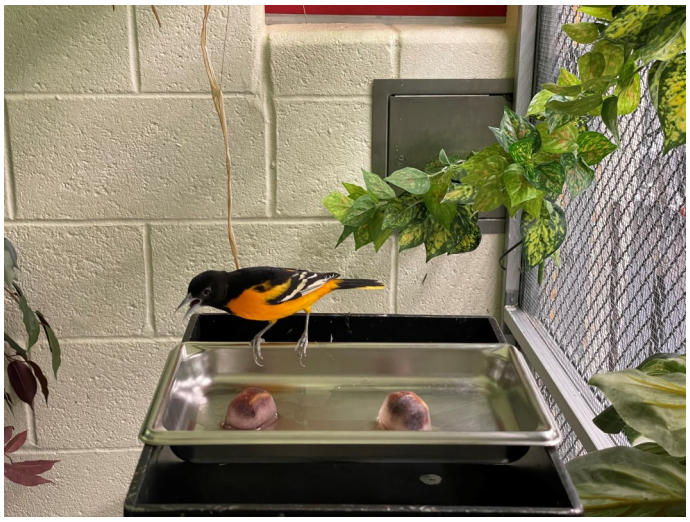
The SAFE North American Songbird program invites and welcomes all interested zoos and aquariums to become program partners, funders and collaborators in our efforts to save and protect North American songbirds. When you think about it, all zoos and aquariums have native songbirds on property! Chances are you are already doing work at your facility that helps songbirds. Please join us in saving our native songbirds!

SAFE®
SAVING ANIMALS FROM EXTINCTION
NORTH AMERICAN SONGBIRDS

Recipe for Passerine-Approved Popsicles!

By Shelby Burns, Animal Keeper, Smithsonian's National Zoo and Conservation Biology Institute

This is great enrichment, especially if you need to occupy some particularly clever birds. Our Baltimore oriole, "Lord", was kind enough to model with the popsicles. We'd love to see your birds enjoying their summertime treat!



Ingredients:

- Fresh blueberries or fresh orange slice
- Ice cube tray (in any shape)
- Mealworms
- Water or gelatin

Instructions:

1. Smush the fresh blueberries down to a pulp
2. Mix with water to get a nice blueberry juice mixture and pour into ice cube tray
3. For nectar eaters—try squeezing fresh orange slices with pulp into ice cube tray
4. Garnish for insectivores with some refrigerated mealworms
5. Place raffia or passerine safe "string substitute" to make for an easy installation
6. Watch your passerines forage and peck their way to the juicy berries and worms!

Note: water can be substituted with flavorless gelatin for a fun treat as well!

Top photo: "Lord" Baltimore oriole enjoying his popsicles.

Bottom row: popsicles prepped in ice cube tray and presented in shallow metal pan on feeding station.

Photos by Becca Zurlo, Animal Keeper, Smithsonian's National Zoo.

Species Fact Sheets

Order:	Passeriformes	**Family:**	Cardinalidae
Scientific Name:	*Passerina cyanea*	**Common Name:**	Indigo Bunting

AZA Management: ☐ Green ☐ Yellow Red ☒ None

Photo (Male): ON LEFT

Photo (Female): ON RIGHT

NATURAL HISTORY:

Geographic Range:	Europe	☐	Asia	☐	North America	☒	Neotropical	☒
	Africa	☐	Australia	☐	Other			
Habitat:	Forest	☐	Desert	☐	Grassland	☒	Coastal	☐
	Riverine	☐	Montane	☐	Other	Shrubby habitat		

Circadian Cycle:	Diurnal	☒	Crepuscular	☐	Nocturnal	☐	Other	Click here to enter text.
Cold Tolerance:	To 70° F	☐	To 60° F	☐	To 50° F	☐	To 40° F	☐
	To 30° F	☐	To 20° F	☐	Other	**Undetermined**		
Heat Tolerance:	To 30° F	☐	To 50° F	☐	To 70° F	☐	To 90° F	☒
	To 110° F	☐	Other					
Diet:	Frugivore	☒	Carnivore	☐	Piscivore	☐	Insectivore	☒
	Nectivore	☐	Omnivore	☐	Folivore	☐	Other (Add Below)	☒

Captive Dietary Needs:

Has been successfully kept on a diet of passerine base mix, egg mix, and insects at Smithsonian National Zoo. The passerine base mix includes Mazuri softbill diet, Mazuri insectivore diet, and chopped banana, apples, zucchini, papaya, blueberries, and melons. The egg mix includes chopped hard-boiled egg in the shell and Marion Zoological All-preem parakeet pellets. Insects offered daily include mealworms, waxworms, and crickets. The diet is changed between the breeding and non-breeding seasons. Non-breeding diet consists of a higher proportion of base and egg mix and a lower proportion of insects. During the breeding season, the proportion of insects to base and egg mix is increased. The National Zoo has found that increasing insects leading into the breeding season has likely contributed to breeding success. Captive buntings should be voluntarily weighed monthly and fat scores taken whenever bird is in the hand to monitor for over-conditioning.

Life Expectancy in the Wild:	Males:	Up to 13 years	Females:	Up to 13 years
Life Expectancy in Captivity:	Males:	Undetermined	Females:	Undetermined

BREEDING INFORMATION:

Age at Sexual Maturity:	Males:	1 yr	Females:	1 yr

Courtship Displays: Males may follow female, do not typically sing in courtship. Less often, male displays on ground – crouched, strutting without vocalization

Nest Site Description: In low vegetation, within a meter of the ground, typically in fork of branches in bushes

Clutch Size, Egg Description: 3-4 eggs, white and unmarked, occasionally with brownish spots

Incubation Period: 11-14 days

Fledgling Period: Fledge at 9-12 days

Parental Care: Female broods and provisions young, male provides little to no care of young but should not be separated from until young reach sexual maturity.

Chick Development: Altricial

CAPTIVE HABITAT INFORMATION:

Social Structure in the Wild: Solitary during breeding season, found in loose flocks during migration and on wintering grounds

Social Structure in Captivity: Not yet determined

Minimum Group Size: 1

Maximum Group Size: Not yet determined

Compatible in Mixed Species Exhibits: Yes

Comments: Can be kept in mixed species groups with other passerines with few issues

Optimal Habitat Size: Undetermined, but they have been housed in off-exhibit holding averaging 8’ x 9’ x 7’.

Management Challenges: It is important to determine sex preferably before breeding plumage is displayed. Males will turn aggressive towards other males in a family group. To prevent injury or fatality, male juveniles should be separated from family group before the next breeding season. All-female groups do well together.

Indigo buntings acclimate to new objects in enclosure slower than other songbird species. This presents management challenges when obtaining voluntary weights with a scale and camera mounted in their exhibit. Our solution to this has been feeding their diet on a scale for several days to acclimate them to it before getting a weight.

ADDITIONAL COMMENTS:

Materials provided for nest construction:
- Bamboo nest cup (canary size)
- Coconut fiber
- Shredded newspaper
- Cotton
- Moss

REFERENCES:

https://birdsoftheworld.org/bow/species/indbun/cur/introduction

https://www.allaboutbirds.org/guide/Indigo_Bunting/overview

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Smithsonian National Zoo & Conservation Biology Institute

Date: 6-Mar-21

Species Fact Sheets

Order:	Passeriformes	**Family:**	Icteridae
Scientific Name:	*Icterus galbula*	**Common Name:**	Baltimore Oriole

AZA Management: ☐ Green ☐ Yellow Red X None

Photo (Male): ON LEFT

Photo (Female): ON RIGHT

NATURAL HISTORY:

Geographic Range:	Europe	☐	Asia	☐	North America	X	Neotropical	X
	Africa	☐	Australia		Other			
Habitat:	Forest	X	Desert	☐	Grassland	☐	Coastal	
	Riverine	X	Montane	☐	Other	Woodland edge, especially riparian		
Circadian Cycle:	Diurnal	X	Crepuscular	☐	Nocturnal	☐	Other	Click here to enter text.
Cold Tolerance:	To 70° F	☐	To 60° F	☐	To 50° F	☐	To 40° F	☐
	To 30° F	X	To 20° F	☐	Other	Has been kept outdoors year-round with access to heated shelter		
Heat Tolerance:	To 30° F	☐	To 50° F	☐	To 70° F	☐	To 90° F	X
	To 110° F	☐	Other					
Diet:	Frugivore	X	Carnivore	☐	Piscivore	☐	Insectivore	X
	Nectivore	☐	Omnivore	☐	Folivore	☐	Other (Add Below)	☐

Captive Dietary Needs:

Has been successfully kept on a diet of passerine base mix, egg mix, and insects at Smithsonian National Zoo. The passerine base mix includes Mazuri softbill diet, Mazuri insectivore diet, and chopped banana, apples, zucchini, papaya, blueberries, and melons. The egg mix includes chopped hard-boiled egg in the shell and Marion Zoological All-preem parakeet pellets. Insects offered daily include mealworms, waxworms, and crickets (only when breeding). The diet is changed between the breeding and non-breeding seasons. Non-breeding diet consists of a higher proportion of base and egg mix and a lower proportion of insects. During the breeding season, the proportion of insects to

base and egg mix is increased. The National Zoo has found that increasing insects leading into the breeding season has likely contributed to breeding success.

Life Expectancy in the Wild:	Males:	Up to 11 – 12 years	Females:	Up to 11 – 12 years
Life Expectancy in Captivity:	Males:	14 years	Females:	14 years

BREEDING INFORMATION:

Age at Sexual Maturity:	Males:	1 year	Females:	1 year

Courtship Displays: When females arrive on breeding grounds in spring, they are courted vigorously as they pass through a male's territory, sometimes chased and driven back within territory boundaries. Male displays to female on his territory by singing and/or chattering while hopping from perch to perch < 0.5 m in front of her. Gives Bow Display: Facing her, he bows with wings lowered and tail fanned and held at about a 45° angle. He then straightens and bows again, about 1 s between bows. While some females ignore such displays, others sing and give Chatter Call in response or give Wing-Quiver Display: Leaning forward, often with tail partly fanned, they flutter or quiver their slightly lowered wings, while giving vocalization much like that of nestlings.

Nest Site Description: Nest commonly built near tip of outer branches of tree (i.e., near perimeter of tree), but sometimes nearer trunk. Female is sole builder; male may occasionally bring material for nest and inspect nest during construction. Nest typically pensile and gourd-shaped, bigger at bottom than at top or middle; often suspended by rim from a few thin branches or held in fork of 2 small branches. Very infrequent reports of orioles refurbishing same nest for second use; generally, builds new nest for each breeding attempt.

Clutch Size, Egg Description: The oval to long oval eggs are pale grayish or bluish white: streaked and blotched with brown, lavender or black lines. Clutch size is 3-7 eggs

Incubation Period: 11-14 days (average is 12) beginning at last egg laid. Hatching can take 2-3 days and completion of the clutch hatching can be up to 5days.

Fledgling Period: Fledging occurs in approximately 11-14 days

Parental Care: Female alone broods the nestlings while both parents will feed the young. The nestlings are fed by regurgitation during the first few days

Chick Development: Chicks weigh ~2 g at hatching

CAPTIVE HABITAT INFORMATION:

Social Structure in the Wild:	Males are territorial on breeding grounds and occasionally on wintering grounds. Fledglings will gather in small flocks before migration while the adults remain solitary.
Social Structure in Captivity:	These birds are not generally social and do not require companionship

Minimum Group Size:	1	Maximum Group Size:	Not yet determined

Compatible in Mixed Species Exhibits:	Yes	**Comments:**	Baltimore Orioles could be housed in a mixed species exhibit with other songbirds and potentially other nectar eaters. If housed in mixed species exhibits, they will consume items atypical of consumption for Baltimore Orioles (e.g. seafood).

Optimal Habitat Size:	Baltimore Orioles have been kept in large free flight aviaries and small off-exhibit holding areas. In off-exhibit holding birds have done best in cages with a minimum height of 11 feet.
Management Challenges:	Juvenile siblings have been observed to show aggression towards each other when housed as a family flock. If the sire is attempting to breed again soon after chicks hatch, consider removing sire from the family group. However, the sire should not be removed if he is assisting the dam with chick feedings.

ADDITIONAL COMMENTS:

Materials provided for nest construction:
- Raffia (cut pieces into 6 inch strips)
- Cotton
- Dried grasses
- Coconut fiber
- Bamboo browse

REFERENCES:

https://birdsoftheworld.org/bow/species/balori/cur/introduction

https://www.allaboutbirds.org/guide/Baltimore_Oriole/overview

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Smithsonian National Zoo & Conservation Biology Institute

Date: 6-Mar-21

Species Fact Sheets

Order:	Passeriformes	**Family:**	Passerellidae
Scientific Name:	*Melospiza melodia*	**Common Name:**	Song Sparrow

AZA Management: ☐ Green ☐ Yellow ☐ Red ☒ None

Photo (Adult Male): ON LEFT

Photo (Adult Female): ON RIGHT

NATURAL HISTORY:

Geographic Range:	☐ Europe	☐ Asia	☐ North America	☒ Neotropical
	☐ Africa	☐ Australia	☐ Other	
Habitat:	☒ Forest	☐ Desert	☒ Grassland	☒ Coastal
	☐ Riverine	☐ Montane	☒ Other	Arctic grasslands, tidal marshes, overgrown pastures
Circadian Cycle:	☒ Diurnal	☐ Crepuscular	☐ Nocturnal	☐ Other Click here to enter text.
Cold Tolerance:	☐ To 70° F	☐ To 60° F	☒ To 50° F	☐ To 40° F
	☐ To 30° F	☐ To 20° F	☐ Other	Click here to enter text.
Heat Tolerance:	☐ To 30° F	☐ To 50° F	☐ To 70° F	☒ To 90° F
	☐ To 110° F	☐ Other		
Diet:	☐ Frugivore	☐ Carnivore	☐ Piscivore	☐ Insectivore
	☐ Nectivore	☒ Omnivore	☐ Folivore	☒ Other (Add Below)

Captive Dietary Needs:

Fruits and seeds year-round, eats insects in summertime.

Song Sparrows have been successfully kept on a diet of passerine base mix, egg mix, and insects. The passerine base mix includes Mazuri softbill diet, Mazuri insectivore pellets, chopped banana, apples, zucchini, papaya, blueberries, and melons. The egg mix includes chopped hard-boiled egg in the shell and soaked Marion Zoological All-preem parakeet pellets. Insects offered daily include mealworms, waxworms, and crickets. The diet is changed between the breeding and non-breeding seasons. Non-

breeding diet consists of a higher proportion of base and egg mix and a lower proportion of insects. During the breeding season, the proportion of insects to base and egg mix is increased. The National Zoo has found that increasing insects leading into the breeding season has likely contributed to breeding success. Captive song sparrows should have their weight and fat scores closely monitored to prevent over-conditioning.

Life Expectancy in the Wild:	Males:	8-9 yrs	Females:	8-9 yrs
Life Expectancy in Captivity:	Males:	Undetermined	Females:	Undetermined

BREEDING INFORMATION:

Age at Sexual Maturity:	Males:	1 year	Females:	1 year

Courtship Displays:	Males are heard singing frequently before a pair bond is established and reduce their song once they gain a partner. Often males select several tall perches within their territory to use as singing locations. They increase singing to pre-bond levels once the female is incubating. Females control mate-choice. Pair formation appears to occur largely from coordinated behavior leading up to nesting. Pairs are often seen foraging and perching within 3 meters of each other.
Nest Site Description:	Nests are a sturdy open cup structure with thicker materials used in the outer layers and finer materials used to line the inside. Materials vary widely across range and habitat, but outside materials may include weed stems, grasses, twigs, and bark strips, while the inside materials may include rootlets, hair, or fine grasses. Nests are generally built low to the ground with dense cover vegetation. Preference for thick grasses or shrubs, but may also build in low tree branches. Nests are built by females, primarily in the morning over several days (average 4 days). Early nest sites may be abandoned before one is completed, and the pair appear to select sites together.
Clutch Size, Egg Description:	3-5 eggs. Eggs are blue, blue-green, or gray-green with brown to red-brown speckling across the shell (rarely lilac).

Incubation Period:	12 – 15 days	**Fledgling Period:**	10-16 days

Parental Care:	The female does all the incubation, but males will assist with feeding young after hatching. As they leave the nest, the male takes more responsibility for feeding the fledglings if the female is renesting.
Chick Development:	Altricial

CAPTIVE HABITAT INFORMATION:

Social Structure in the Wild:	Territorial on breeding grounds, juveniles form loose flocks, found in mixed foraging flocks

Social Structure in Captivity:	Juveniles from separate clutches successfully introduced and housed together. Adults tolerate each other in loose-mixed species flocks when not breeding. Once breeding, pairs will fiercely defend their territory from all other birds.

Minimum Group Size:	1	**Maximum Group Size:**	Undetermined

Compatible in Mixed Species Exhibits:	Yes	**Comments:**	Male may be intolerant of heterospecifics not just conspecifics during territory establishment and courting of female. When separated, both males and females may be housed with mixed species flocks year-round in off-exhibit holding. Not enough information yet on successful housing in aviaries during the year, but with a larger walk-through aviary it seems plausible to house a small flock without issue.

Optimal Habitat Size:	Undetermined, but they have been housed in off-exhibit holding averaging 8' x 9' x 7'. Successful breeding occurred in this enclosure set-up with nests built by birds in 4-to-5 foot tall artificial Ficus trees.

Management Challenges:	Pairs will often have multiple broods in a season, and the female will re-nest close to fledging of each clutch. The male would normally take over feeding at this point but he may uncommonly reject the fledglings and harass/attack them like an intruder. Removing the male to encourage the female to continue care of the fledglings does not work, since she has already re-clutched and biologically is inclined to incubate instead. All fledglings may be hand-reared until self-sufficient. Once released to a regular enclosure they showed good signs of caution around people and should be fine for an aviary.

ADDITIONAL COMMENTS:

REFERENCES:

https://animaldiversity.org/accounts/Melospiza_melodia/

https://www.allaboutbirds.org/guide/Song_Sparrow/lifehistory

https://birdsoftheworld.org/bow/species/sonspa/cur/introduction

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Northern cardinal (Cardinalis cardinalis) by Eric Peterson

Our goal is to continue publishing biannual newsletters, issues for both spring and fall to coincide roughly with the celebration of World Migratory Bird Day. If your facility works with native songbirds, is developing husbandry or breeding protocols, or is providing a permanent home for non-releasable native songbirds, we want to hear from you!

Please email all materials to an editor by May 1 or September 1 to be included in the next issue.

NASWG
NORTH AMERICAN SONGBIRD WORKING GROUP

Submission Tips:

- Articles are recommended to be approximately 750 words.
- Pictures should be included where possible.
- Credit the author and organization/facility name.
- Submit materials in Microsoft Word with pictures either attached to the email or within the word document. Don't worry about formatting, that's our job!
- Provide references if applicable.