

Ringneck Doves

A Handbook of Care & Breeding

With over 100 Full Color Photos, Including Examples of over 30 Different Ringneck Dove Colors and Varieties.



K. Wade Oliver

Ringneck Doves

A Handbook of Care & Breeding

By K. Wade Oliver



First Edition

Ringneck Doves: A Handbook of Care & Breeding

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Ringneck Dove Genetics (pages 55-60)

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Front Cover Photo: Tangerine Ringneck Dove

Back Cover Photo: Inquisitive Ice Ringneck Dove

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Doves are often called pigeons (or visa versa) and, in fact, there is no scientific difference between the two. However, when a distinction is made between wild doves and pigeons, it is that the larger birds are often called pigeons and the smaller are called doves. Regardless, all pigeons and/or doves are of the order Columbiformes and the family Columbidae.

Of the more than 300 different species of doves which inhabit nearly every corner of the world, there is one particular variety that has truly captivated those who love them: the Ringneck Dove (*Streptopelia risoria*).



An orange pearly Ringneck Dove with excellent markings, including a nice white neck ring.

Ringneck Doves (*Streptopelia risoria*) are totally domesticated birds that are widely believed to be a descendant of the African Collared Dove (*Streptopelia roseogrisea*). They are approximately 11 inches long, from tip of beak to tip of



Though this bird looks completely white, it is actually "frosty pied." This color is most commonly called ice.

Ringneck Doves

tail, and were likely brought to America as pets not many generations after Columbus' visit. Until fairly recently (mid 1900s), Ringneck Doves were only known in two color varieties: "blond" (or "fawn") and "white." In fact, for many years, each color was thought to be a separate species. By crossing the Ringneck Dove (*S. risoria*) back to the African Collared Dove (*S. roseogrisea*), the "wild" color again became available. Ringnecks make wonderful pets, due to their docile nature and ability to acclimate well to smaller cages.

Currently, due to a number of **gene** mutations and combinations, there are approximately 40 different color varieties of the Ringneck Dove available in the United States. Each of the genes and a number of the color varieties they produce will be covered in a later section.



Several Ringnecks of various colors in a holding cage during a quarantine period.

Unlike other pet birds, doves cannot be taught to talk or do tricks. The most they will likely ever master is sitting on your finger or shoulder, if you patiently take the time to tame them with your gentle presence. However, what doves lack in smarts is made up in their classic beauty. It is no wonder that doves have been considered through time and throughout the world as a symbol of peace.

Doves are occasionally seen in pet stores, and there are also many dove breeders who raise and keep doves and offer them for sale. And though pet stores may seem like the most natural place to purchase a pet bird, you may first want to consider a private breeder for a number of reasons.

First, they know their doves. As a rule, breeders can better answer your questions and the birds are generally well taken care of. Second, when purchasing from a breeder, the cost is usually much more reasonable than a pet store. Keep in mind that the price you see at the pet store is significantly marked up from what a breeder may charge. Third, available color varieties are quite limited in pet stores, which rarely have more than one or two varieties available. Fourth, good breeders keep track of the age of their doves, along with other information, and if you ask them, they can tell you the age and pedigree of a dove by looking at the band on the bird's leg. Fifth, many breeders will ship the birds right to your doorstep at a very reasonable cost. This is a wonderful convenience.

When looking for a dove, you may want to consider first joining the American Dove Association, which provides its members with a directory of breeders from across the United States and beyond. Contact information for the American Dove Association and Canadian Dove Association is located later in this publication.

Regardless of where you get your dove, the most important thing to consider is how well the bird is conditioned. Does it look healthy? Are the feathers out of sorts? Does it look puffed up and sit listlessly on the perch? Do the eyes look droopy? Do the droppings look normal? A healthy bird will have a smooth coat of feathers and will be alert and interested in its surroundings.

Optimal health is always a consideration for your doves. If you keep other birds, it is important that you **quarantine** your new acquisitions for a month or so, in a separate cage, before putting them near your existing birds. This will allow for the new birds to get used to their surroundings and give you a chance to watch them closely for any signs of potential disease.



Attending a bird show can provide a wonderful opportunity to purchase doves. Not only are there a number of beautiful birds to choose from, but you can also meet the breeders.

Those new to the hobby often express surprise when they learn just how simple, safe and affordable it is to ship doves to one another throughout the United States. Because of the classification of doves and pigeons as poultry, the United States Postal Service (USPS) allows them to be shipped via overnight Express Mail. Reports of complications are extremely rare with literally thousands of doves being shipped each year. The birds arrive healthy, happy, and ready for their new home, after what seems like just a longer night than usual.

When shipping birds, you first must have an approved shipping box. In order to ship birds, your shipping box must be large enough for the birds to rest comfortably. The USPS requires that bird shipping boxes be equipped with an “air filter” over the air holes, and have a “viewing window” to allow employees to inspect the package contents.

These requirements may initially seem prohibitive, but don’t let them scare you off. There are actually special shipping

boxes designed and manufactured specifically for shipping birds. Perhaps the most popular are those created by Horizon Micro Environments.



A USPS approved bird shipping box manufactured by Horizon Micro Environments. Notice the air holes and tapered portion to allow optimal air-flow during shipping.



A battery of breeding cages used to house three pairs of Ringneck Doves.

When preparing your box for shipping, you must be certain to add proper bedding to the bottom of the box. The layer of bedding needs to be at least one to two inches deep. Good bedding materials include soft, dried pine needles, wood shavings, or shredded newspaper.

It is important to let your doves eat and drink as much as they can before their trip, and often recommended that you leave the lights on all night the night before you ship, so the birds will stay awake longer and eat more. This way, they are also more apt to enjoy the time in the dark during their trip.



Dried grass makes an excellent bedding material. Notice the "bio-filter" over the air holes designed to promote optimal health.



Here two shipping boxes are fastened together to facilitate the shipping of more birds in a single shipment thereby lowering total postage costs.

Unlike most other dove species, Ring-neck Doves will live comfortably, alone or in pairs, in a cage that measures approximately 2 feet by 2 feet by 2 feet. This size allows them to flap their wings in exercise and gives them room to move freely. A perch should be placed in the cage with plenty of room on all sides to keep the dove from rubbing its tail feathers on the sides. Food and water containers must be positioned so they are not under the perches where they would be soiled by droppings.

When choosing a cage for your dove, you should ensure that the cage is longer, rather than taller. There are many ornate and pretty cages that are not suitable for doves, because they are tall and narrow. While this type of cage works well for parrot species, which climb the sides of the cage, doves do not climb, and spend significant time walking and flying from one end of the cage to the other.



Ringnecks are not suited for ornate cages such as this one which is taller and narrow.

Excellent cages are available for purchase from a variety of different sources, including pet stores, feed stores, and online catalogs. Many dove fanciers prefer to build their own cages out of welded wire mesh, which allows them to get their preferred dimensions just



An example of cages made out of welded wire mesh with openings that measure 1" x 2". Welded wire mesh is available from most neighborhood hardware stores. Photo by John Fowler.

right. However, whether your cages are commercially made or homemade, what matters most is that cages have proper dimensions and allow for droppings to fall through the bottom wire for easy cleaning.



An example of an excellent cage for ringneck doves. It measures 18" x 18" x 30".

Some Ringneck fanciers prefer to keep their birds in an **aviary**, which is much larger than a pet cage. While a larger aviary is not a requirement for



A large, comfortable cage suitable for holding a number of young ringneck doves until they reach maturity.

Ringneck Doves, as it is for exotic dove species, they will do quite well, as long as there is no overcrowding. The size and scope of an aviary (both indoor and outdoor) is limited only by your imagination, space, and budget. Aviaries may be purchased or built from scratch. If you are interested in designing and building your own aviary, there are books available on the subject and a number of websites which cover the topic thoroughly.

It is important to note that, regardless of the enclosure size, male Ringnecks are quite territorial and will fight with other males and pester other females if there is not enough room in the aviary. A good rule of thumb is to keep no more than one pair of Ringnecks per 10 square feet of available floor space in an aviary.

Ringneck Doves tend to be quite cold-hardy and may be kept outdoors throughout the year, even in below-freezing temperatures. If you keep your birds outside in the winter, it is vital to see to it that they are protected from the elements. They should always be able

to get themselves away from wind and precipitation. Common ways to provide this are to cover flights with plastic or attach a shelter unit to flights where your doves may go to escape the elements.

If your birds will be kept outdoors in extreme cold temperatures, their perches must be wide and flat, rather than round. This will allow your birds to keep their toes flat, so they can cover them with their bodies, thus avoiding frostbite.



A very nice outdoor aviary suitable for doves. Notice the attached shelter.



This beautiful aviary has been conveniently built on a deck for easy viewing and access.



These doves seem to really enjoy this roomy aviary. Thanks to Ron Banks for these beautiful aviary photographs. Visit Ron on the web at <http://www.backyardaviary.com>.

Ringneck Doves are seed eaters. Unlike other pet birds (parrots, finches, parakeets, etc.), doves do not husk the seeds before eating them. They swallow the seeds whole. This is a plus for dove keepers, since there is no question about the amount of food in a dish where, with other birds, the seed cups quickly fill up with husks, making it harder to determine the amount of seed remaining.

The type of seeds preferred by Ringneck Doves generally includes both small and large varieties, such as milo, millet, wheat, safflower, black sunflower and cracked corn, each of which has different nutritional components. Commercial dove mixes are available from many pet stores, and it is important to be aware that Ringneck Doves also do very well with high-quality wild bird mixes offered at home and discount stores, as well as seed mixes that are labeled for finches and parakeets. In other words, don't worry as much about how the seeds are labeled, as that there be a variety of the above-mentioned seeds included.



A quality seed mix will include a variety of seeds and pellets.

As a rule, Ringneck Doves tend to establish favorite seeds that they will devour first. You will notice almost immediately the tendency of Ringnecks to use their bill to pick through their feed dish by shifting and moving seeds until they find just the ones they are looking

for. This is often referred to as “throwing” their seed, due to the amount that ends up outside of the dish. There are a number of feeding containers available from pigeon supply stores that are specifically designed to cut down on the amount of seed that ends up on the floor. You may also want to consider making your own feed dish by simply cutting a small hole in the top of a used plastic butter container or in the side of a half-gallon milk container, in an effort to keep seed in the dish.

Food Dish Photo

A quality seed mix will include a variety of seeds and pellets.

In addition to the nutrition that comes from the seeds, Ringnecks often need additional nutrition. Some seed mixes include nutritional additives, or commercial supplements may be added to their food or water. You may also want to consider the introduction of other items, such as chopped vegetables or crushed, boiled eggs to their diet.

Perhaps the most important nutrients needed by doves, beyond what comes from their food, are calcium and Vitamin D³. Doves need plenty of calcium for bone and egg development, and an excellent calcium source will be discussed in the next section. Vitamin D³ assists in the absorption of calcium. Exposure to sunlight promotes the production of Vitamin D³, and perhaps the easiest way to provide this nutrient is by simply placing the cage in a place where your dove may move in and out of direct sunlight as desired.

In addition to seeds, your dove also needs access to **grit**. Grit is a compound made up of ground minerals and resembles sand. The role of grit for doves is two-fold. First, it is thought that grit is used by wild birds to assist in the grinding of their food. Grit is also an excellent way for birds to obtain minerals in their diet, especially calcium.

Domestic birds, such as Ringneck Doves, are likely being fed fresh seed. Therefore, grit is not needed so much for grinding food, as it is for the nutritional value. Excellent calcium sources that may be used as grit for your doves include crushed oyster shell, limestone granules, or even ground eggshells.

If you choose to purchase a commercial grit mix, it is wise to look at the ingredients on the package to ensure that you are getting what you need. Grit should first and foremost include a calcium source, as mentioned before. Other substances that may be included in commercial grit are common sand (for food grinding purposes), limestone granules, and tiny bits of charcoal (digestion aid). Some varieties of grit also include a coating of other nutritional supplements. Grit should always be offered in a separate dish, not mixed in with your dove's food.



This commercial grit mix includes small limestone granules, crushed oyster shell, and small pieces of charcoal. The purple color comes from a coating of vitamins.



Every grit mix should include a quality calcium source such as crushed oyster shell.

Simply stated, doves need access to clean water at all times. Without constant access to clean, fresh water, Ringnecks will dehydrate quickly. Dehydration is a very dangerous condition and causes suffering and death. It is vital that water be kept clean to promote the comfort and good health of your dove. Make sure to keep all food and water containers away from where they may be soiled by birds perching above.

Doves are somewhat unique, in that they drink in a particular way. Rather than dipping their bill in the water and then lifting their head to allow the water to run down their throat, doves place their bill in the water and then promptly suck it down in a sort of pumping motion.

Cleanliness is essential. Without this virtue, your cage will be a breeding ground for disease, which quickly develops into disaster. You must clean your dove's environment often to avoid disease and keep your bird comfortable and content. Dropping trays should be emptied every few days and should be thoroughly cleaned, along with the cage bottom, at least once per month. Since all birds are very sensitive to most commercial cleaning products, it is wise to instead clean their cage with a homemade solution, consisting of 1 part bleach to 20 parts water.

The fact that doves mate for life is often endearing to those who keep them. That is why doves are often purchased and kept in mated pairs. If you plan to keep a mated pair of doves, it is important to recognize that it is likely that you will have more than just the one pair in a fairly short time. Ringneck Doves tend to be quite prolific when it comes to reproduction. Most dove owners find the courting behavior and reproduction of their birds fascinating. It is also common for fanciers who begin with one pair of Ringneck Doves to expand their collection to many pairs, as they become more familiar with the different color varieties. Whether you want to keep just one breeding pair or many, you will want to make sure you provide a comfortable atmosphere for your birds.

A number of important things need to be considered when breeding doves. First, the birds must be properly conditioned. The process of laying and hatching eggs and caring for the young takes an enormous amount of energy and, if the birds are not in condition, the process may be detrimental to their health. Conditioning birds consists of ensuring they receive proper nutrition, an ample supply of clean water, access to a calcium source, such as properly formulated grit, and plenty of sunlight, as mentioned earlier.

The breeding instinct in birds is triggered by the amount of light they receive each day, which is called the **photoperiod**. The photoperiod for breeding doves should be between 14 and 16 hours per day, and ideally the light should come from the sun. However, since it is not always possible to provide direct sunlight for your birds, you may want to consider providing artificial sunlight in the form of full-spectrum fluorescent

lighting, which is available at any home or discount store.



Make sure that birds kept indoors are exposed to full-spectrum fluorescent light and not only regular indoor lighting.

When a pair of well-conditioned, adult Ringneck Doves are placed in a cage together, there is a period of time in which they will work out any territorial issues, get to know each other, and eventually bond together as mates. This period is typically referred to simply as **bonding** and lasts from two weeks to a number of months, depending on the individual preferences of each bird. As the birds get to know each other, you will notice them sitting closer and closer together on the perch and often billing (which has been described as “bird kissing”) and preening each other. If the birds are of breeding age (9-12 months), you will also begin to notice that the male does all he can to impress the female.

Male Ringnecks primarily display their interest in a female by making a long drawn-out sound called a **coo**. This cooing, which is represented in various notes as COO coo coo COOOOO, generally takes place in three situations which are all part of the courtship. The first cooing situation is when the male simply sits on the perch and coos to establish territory and let it be known that he is “in the market” for a mate. The second cooing situation comes when a

male has spotted a female in which he is interested and is doing his best to convince her he is a nice guy. He is showing off. The male coos with the same sound as in the first situation, but it is accompanied by rhythmic and repeated bowing before the female, as though he is worshipping her, therefore this is commonly referred to as the **bow coo**. On occasion, female doves will also coo but the sound is typically much more muted than the coo of a male and rarely is bowing involved. Of course, every now and then, a female dove will trick even the most experienced keepers.



This silky wild pied male is “bow cooing” in an attempt to impress the orange pearled female. Photos by Mary Ellen Robinson.

Once the female is convinced, the male will then climb into the nest and coo with the same sound again, but this time he is positioned in what looks like a permanent bow. He flutters his wings very lightly to get her attention and let her know that he has found a suitable nesting sight. This behavior is typically called the **wing flutter**. It is during this time that you may even see the female joining in the wing flutter and affectionately putting her bill in the mouth of the male and intimately feeding as though she were a baby.

The actual copulation usually takes



This wild-type male is demonstrating the wing flutter in an attempt to attract his mate to the nesting site.

place sometime between the bow coo and the wing fluttering in the nest. With the female sitting on a perch, the male gently climbs on her back and then, in a sort of acrobatic move, leans backward while trying to create a union between their **cloacae**. At this same moment, the female will move her tail to the side in an effort to receive the union from the male.

Once fertilized, the eggs take a week or so to develop. All this time, the male is also **driving** the female to the chosen nesting site. He will literally chase her to the nest. This usually looks more rough than it is, but on very rare occasions injury may result. Therefore, it is wise to keep an eye on the pair.

Ringneck Doves do very well breeding in a relatively small cage. Ringnecks are not typically community breeders so one pair per cage is advisable. It is not uncommon to raise Ringnecks in cages that are as small as 18 inches high by 18 inches long by 30 inches wide or 24 inches high by 24 inches long by 24 inches wide. These might seem like pretty close quarters, but since Ringneck Doves have been domesticated for so many centuries, they will do quite well.

Introducing a pair of Ringnecks to a cage is an important time. Not only are they getting used to each other, they are also getting used to the cage. It is good to have a nest in place about the time the birds are put into the cage, so there will not be any cause for alarm later. In general, doves are not known for their nest building expertise. Ringneck Dove nests are generally flimsy structures with just a few twigs seemingly thrown together. It is important that you help them by placing a **nesting container** in the cage for them to use when building a nest. Nesting containers can be elaborate or simple. They can be constructed of wood or could simply be an old plastic dish as long as the dimensions are a minimum of 6 inches square. Doves prefer open nests like a bowl, not covered like a nest



Nesting containers can be anything that will keep eggs from rolling out of the nest. Plastic bowls make an excellent nesting container. Photo by Mary Ellen Robinson.

box used by hookbilled species.

Nests should be placed at the same level as the perch and not higher or lower. This will discourage the dove from using the nest as a perch and also prevent the dove from soiling the nest as it perches above. Nest building takes place throughout the breeding cycle. The male does most of this by simply dropping a few provided twigs or bits of grass into the nesting container, with the female arranging them as she would like. Long, soft, dried pine needles also



Soft but sturdy nesting material is essential. Timothy hay is an excellent example of high quality nesting material..

make excellent nesting material.

Ringneck Doves lay two white eggs per clutch, each of which are approximately 1 ¼ inches long and ¾ inches wide, that hatch 14 days after the second egg is laid. Both males and females share **incubation** duties, with the male sitting during the day, and the female sitting during the evening and through



This Ringneck Dove has found a suitable nesting site in a recycled Christmas tree.

the night.

Unlike **precocial** birds like chickens, pheasants, and quail that are able to eat on their own upon hatching, baby doves are known as **altricial**, meaning that they hatch with their eyes closed and with a sparse down, rather than feathers. They are completely reliant on their parents for food, warmth, and protection.

Newly-hatched doves, often called squabs, are then fed by the parents us-



These squabs are one and two days old.



The same squabs at five and six days old.



The same squabs at ten and eleven days old.



The same squabs at fifteen and sixteen days old. They will be self-sufficient within another two weeks or so.

ing a thick milky substance called crop milk. **Crop milk** is produced in the crop of the parents, and the squabs put their beaks inside the parent's throats to slurp it down. Within a few days, the parents add seed to the diet. Squabs feather out and grow very quickly. Baby Ringneck Doves typically fledge two to three weeks after hatching and are totally in-



A wonderful parent feeding a chick. Thanks to Mary Ellen Robinson for this photograph and the photographs of growing chicks at the left..

dependent four weeks after hatching.

You may notice that the parents will lay their next clutch of eggs at about the same time their first clutch becomes independent. In fact, it is not uncommon to see some pairs lay all year, beginning on a new clutch every six weeks. Feeding and taking care of young really takes its toll on the energy of the parents so, after three or four clutches, breeding should be stopped by either removing the eggs and replacing them with wooden **dummy eggs**, or separating the birds for a few months.



Dummy eggs made of wood or plastic are available from pigeon supply stores or even your local craft store.

Responsible breeding includes accurate record keeping. It is recommended that you keep accurate record of all offspring including pedigree, hatch dates, sex, and genetics if possible. Various tools are often effectively used, such as notebooks, cage cards and computers.

Perhaps the most useful item used in record keeping is the **leg band**. Information such as the year and a unique number can be recorded on each band and colored bands allow for quick identification of individual birds, especially when there are a number of birds of the same color variety in the same flight. Leg bands may be purchased from a number of poultry supply companies, or members of the American Dove Association may purchase identification bands signifying membership.

A seamless leg band should be placed on a leg of each of your birds when they are from 5-10 days old. Waiting too long will make it impossible to fit a seamless band on the leg of the bird. See the banding demonstration on the next page.



These are seamless bands which are available to members of the American Dove Association. Each band is imprinted with the current year and a unique number.



Colored bands, such as these, are often used to identify family lines or gender. These bands are split, allowing them to be easily placed on the legs of adult birds.

Pair Number	2	
Male Band	YA 197	Phenotype Violet Neck
Genotype	D// TallTa Fr// M//M	
Female Band	YC 824	Phenotype Ash Purple
Genotype	D// TallTa Fr//	
Young		
Band Number	Hatch Date	
Band Number	Hatch Date	
Band Number	Hatch Date	
Band Number	Hatch Date	

An example of a "cage card" used by the author to keep records for a period of time until they can later be transferred to a computer database.



When banding, you must first firmly, but carefully, hold the young bird in your hand. Then with your thumb and a forefinger, grasp the foot on the leg you plan to band. Baby doves should be between 5 and 10 days old when banding.



Then place the band over the front three toes keeping the back toe free. It is wise not to wait too long after hatching, to put on a leg band in order to minimize the discomfort for the baby bird.



Then slide the band up the leg over the ankle and the back toe. You may need to use a toothpick to free the back toe from the band. It is wise to have a toothpick and perhaps a lubricant on hand before beginning the banding process.



Then slide the band back down the leg until it rests on top of the foot. Make sure that the fit is loose and not causing any discomfort to the bird.

As alluded to earlier, there are two genes which cause varying degrees of dilution to the **wild-type** (dark) coloration.

The blond (d^B) gene causes a moderate level of dilution, which lightens the bird to a tan color with a dark charcoal neck ring. The blond gene is **recessive** to the wild type coloration, but dominant to the white gene. The blond gene is **sex-linked**.

The white (d^W) gene causes a more extreme dilution, which turns the bird completely white except for a very faint, cream-colored neck ring and orange eyes. It is this color that is perhaps the most well-known throughout the world. The white dove is a symbol of peace to nearly every culture. It is little known that the immensely popular white dove is in all actuality a Ringneck Dove. When “white doves” are released during special occasions, those birds are not really white doves. They are white-colored domestic pigeons that are trained to return to their home. The white gene is recessive and is sex-linked.

In addition to these two genes which affect feather color by dilution, there are five other genes which cause other coloring effects to occur.

The ivory (iv) gene creates a bird that has a dark shade of ivory on the back wings and tail. The breast is nearly white, and there is a dark charcoal neck ring. The ivory gene also causes a “mottled” or “speckled” effect in the coloring of the iris in the eye. The ivory gene is recessive.

The tangerine (Ta) gene creates a bird having a rich tangerine color on the body, wings, and tail and having a rose or violet head and neck as in the wild type. The flight feathers in the wings are white or varying shades of light grey. The neck ring is white. The tangerine gene is **co-dominant**.

The rosy (ry) gene creates an effect quite similar to the “tangerine,” with a tangerine-colored body, wings, and tail. The head and breast are rose or violet, but the neck ring is black, and the flights are dark grey. The rosy gene is recessive.



Several white, blond and tangerine Ringneck Doves perching together. Photo by Greg Sweet.



The under-tail bar is often used as an identifier, especially when measuring dilution.

The albino (al) gene, as in other creatures, allows no pigment in the bird whatsoever, and the bird appears completely white. There is no neck ring, and the eyes are pink. Albino Ringnecks have poor eyesite and should not be kept in large aviaries to prevent inadvertent injuries, with the bird being unable to see obstacles while in flight. The albino gene is recessive.

The frosty (Fr) gene creates a bird that looks somewhat like the wild type, but rather than having a rose-colored head and breast, the dove is grey from head to tail. The neck ring remains black, and the flights display a grizzled or “frosted” effect. There are often also bits of white in the tail and on the cap of the head. The frosty gene is co-dominant.

The pied (pi) gene affects the pigmentation of a bird in a very interesting way. An otherwise normally colored bird has randomly located splashes of white feathers. This effect can occur on birds of any color and is often quite popular. The pied gene is recessive.

There are three more genes which cause effects to feather structure and orientation rather than coloration.

The silky (L) gene affects the actual structure of the bird’s feathers, causing

them to look somewhat more like hair than feathers. This effect limits flying ability and may occur in any color. Silky doves are easily tamed and are often sought after as pets. Silky doves should never be mated together, because a double dose of the “silky” gene causes an undesirable feather condition called “super silky” in which feathers are little more than spines. The silky gene is co-dominant.

The tufted (Tf) gene causes the feathers on the forehead to reverse their normal orientation and point forward in a sort of tuft. The tufted gene is still fairly new in the U.S. and appears to be dominant with variable expressivity.

The crested (cr) gene also effects feather orientation, but this time on the back of the head, causing a sort of crest. The crested gene is new to the U.S. and appears to be recessive.

By combining two or more of each of these genes, a number of other colors or varieties may be produced. Currently, there are approximately 40 documented colors which derive from combinations of these genes. For a more detailed explanation of Ringneck Dove genetics see Appendix B at the end of this publication.

The following pages contain photos and descriptions of 31 different colors and varieties of the Ringneck Dove. Each variety is illustrated with one or more photographs showing the entire bird and perhaps details particular to the variety. Much of the fun about breeding Ringneck Doves is producing favorite colors and varieties.

The genes required to produce each

variety are also listed. When breeding Ringneck Doves it is recommended that attention be paid to the genetic makeup of each bird in an effort to keep the gene pool from being muddled and unpredictable. After the listing of 34 colors and descriptions there is a chart which outlines, in table format, which genes are involved in producing each variety.



A beautiful tangerine pearl Ringneck Dove, perhaps the author's favorite color variety.



Albino

al//al

Albino Ringnecks are completely white with no pigment at all. There is no visible neck ring and the eyes have a pink iris and dark pink pupil. The bill is light. Albino Ringnecks have poor eyesite and should not be kept in large aviaries to prevent inadvertent injuries, with the bird being unable to see obstacles while in flight. The albino gene (al) is recessive, meaning it must be passed on from both parents, and may be carried “hidden” and passed on to the offspring from parents with normal pigment. White Ringnecks are often confused as albino while they are young but are easily identified by the slight, off-white neck ring, slight under-tail bar and darker red eyes that develop as they mature.



Apricot

D+// Ta// iv//iv

Apricot is a combination of the ivory (iv) and tangerine (Ta) genes. The head and breast is a light cream color and the wings, back and tail are peach or orange. The bill is light. The eyes are orange-red and, as in all other combinations that include the ivory gene, the iris is mottled.



Ash

$d^B//Ta//Fr//$

Ash is a combination of the blond (d^B) tangerine (Ta) and frosty (Fr) genes. The body of an ash bird ranges from a near white to light dusty gray. The head and breast are a soft almond color and there is light-orange lacing on the wings and back. The neck ring is varying shades of gray to near white.



Frosty Ash Pearled

D+// Ta// Fr//

Frosty Ash Pearled is a combination of the tangerine (Ta) and frosty (Fr) genes. The body of this bird is an even bluish gray with the head and breast being a dusty rose color. There is a tangerine-colored pearling effect on the wings and back. Since both the tangerine and frosty genes are co-dominant, it is possible to obtain an ash bird from a tangerine paired with a frosty. Ash Pearled birds can be produced with both homozygous (inset photo) and heterozygous (main photo) tangerine which affects the amount of pearling present.



Blond (Fawn)

$d^{B//}$

Blond (d^B), also often called fawn, is one of the first genes known to alter the color of the Ringneck Dove. The blond gene is sex-linked and acts to moderately dilute the dark, wild-type color. Blond Ringnecks are basically a brown bird with a dark charcoal to black neck ring. The eyes are dark red-orange and the bill is dark. The blond gene is often displayed in other color varieties, causing a slight dilution or lightening effect as illustrated by the inset photo of the undertail bar. It is recessive to the wild-type gene and dominant to the white gene.



Bulleyed White

$d^W// pi//pi$

This is a combination of the white (d^W) and pied (pi) genes and is white from head to tail. The eyes are black (or bluish-black in the sunlight) and the bill varies from light to dark. There is no visible neck ring. Occasionally an all-white pied bird will come from pied combined with other color varieties as well and is also considered a bulleyed white and accounts for the darker bill shades.



Cream

D+// iv//iv ry//ry

Cream is a combination of the ivory (iv) and rosy (ry) genes. The head and breast are off-white to white and the wings and back are cream or light tan. The eyes are a rich reddish color and, as in all other combinations that include the ivory gene, the iris is mottled. The neck ring is tan.



Crested

cr//cr

Crested is used to describe the feather orientation on the back of the head. The crested (*cr*) gene causes the feathers on the back of the head to “stand up” and look somewhat like a bad hair style. The crested gene is recessive and has only been in the United States since 2002. Crested may be produced in any color variety.



Blond Frosty

$d^B // Fr //$

Blond frosty is a combination of the blond (d^B) and frosty (Fr) genes. The entire body is grayish-tan and resembles a regular blond or dark ivory bird. Perhaps the easiest way to identify this variety is the “frosted” or “grizzled” effect on the flight feathers that accompanies the frosty gene. The neck ring is dark gray to black and the eyes are reddish. As with other combinations which include the frosty gene, there may be white in the tail and on the back of the head.



Dark Frosty

D+// Fr//

Frosty looks very much like the wild-type bird but without the rose-colored head and breast. The neck ring is black and the eyes are reddish but softer than in the wild-type. It also causes a “grizzled” or “frosted” effect in the flight feathers and undertail bar as illustrated by the inset photos. Frosty Ringnecks also tend to have white in the tail feathers and on the back of the head. The frosty (Fr) gene is co-dominant and has proven lethal in a homozygous (“double dose”) state.



Ice

D+// Fr// pi//pi

Ice is the name given to the combination of the frosty (Fr) and pied (pi) genes so, in essence, and ice is a pied frosty. The body, from head to tail, is white with occasional random dark bluish-gray feathers throughout the body. The bill and eyes are dark and there is no neck ring.



Dark Ivory

D+// iv//iv

The ivory (iv) gene creates a bird that has a shade of brown on the back wings and tail. The breast is nearly white, and there is a dark charcoal neck ring. The bill is typically light with a darker tip. The ivory gene also causes a “mottled” or “speckled” effect in the coloring of the iris in the eye as illustrated by the inset photo. Many color varieties of the Ringneck Dove derive from gene combinations which include the ivory gene. The ivory gene is recessive.



Show Ivory

$d^B//iv//iv$

Show ivory is a combination of the ivory (*iv*) gene and the blond (d^B) gene. The body is off-white and the wings and back are a light grayish-tan. The neck ring is dark gray to black and, as in all other combinations that include the ivory gene, the iris is mottled.



Silver Ivory

D+// iv//iv Fr//

Silver ivory is a combination of the ivory (iv) and frosty (Fr) genes. The head and body are white and the wings and back have a light silver-tan sheen. The neck ring is a medium gray and the bill is light. As in all other combinations that include the ivory gene, the iris is mottled.



Orange

$d^B//Ta//$

Orange is a combination of the tangerine (Ta) and blond (d^B) genes. Basically, it is a diluted tangerine. The head, body wings and back are a rich, rusty orange color. There is no violet on the head and breast. The flight feathers and neck ring can be varying shades from white to grey and the eyes are dark red-dish-orange.



Orange Neck

$d^B//Ta//Ta Fr//M//M$

Orange neck is a combination of the blond (d^B), frosty (Fr), and tangerine (Ta) genes with a “double dose” of the tangerine gene. It is also thought that there is a modifier (M) gene at work. The head and breast are a light orange (some say pink) color and the body, wings and back are white. The neck ring is white and there is often a white patch on the top of the head forming a sort of “cap”. The orange neck can be thought of as a diluted violet neck.



Orange Pearled

$d^B//Ta//Ta$

Orange pearled is a combination of the tangerine (Ta) and blond (d^B) genes with a “double dose” of the tangerine gene which causes the pearling effect. In this bird the head, breast and body are a rich orange color. The back and tail are white with orange pearling. The neck ring is white and the eyes are brown. Basically this bird is a diluted tangerine pearled.



Orange Whiteback

$d^B//Ta//Ta M//M$

Orange Whiteback is a combination of the tangerine (Ta) and blond (dB) genes with a “double dose” of the tangerine gene which causes a pearling effect. It is also thought that there is a modifier (M) gene at work which causes the pearling to be extreme to the point of the back being white instead of pearled. This bird is basically an orange pearled with a completely white back.



Peach

$d^B//ry//ry$

Peach is a combination of the rosy (ry) and blond (d^B) genes. From head to tail this bird is a soft orange or peach color. The neck ring is medium gray and eyes are orange. The bill is light. Peach is occasionally confused with orange but is lighter and is in actuality a diluted rosy.



Pied

pi//pi

The pied (*pi*) gene causes randomly located white patches on an otherwise normally colored bird. The pied condition can occur on any color variety with a wild-type pied shown in the above picture. Pied birds have black eyes and the bill varies from light to dark. Many who see a pied bird for the first time wonder if it is a crossbreeding of white and another color but soon learn that this is not correct and that the pied effect is caused by a separate gene. There are any number of random pied patterns as illustrated by the photo below.





Pink

$d^W//Ta//$

Pink is the name given to a combination of the white (d^W) and tangerine (Ta) genes which is actually an extremely light shade of orange. It often takes a trained eye to recognize a pink bird from a white one. The bird looks white at first glance but, when looked at closer, a very light rusty-red sheen can be seen on the back and wings. There is no visible neck ring and the eyes are dark orange.



Platinum

$d^B//iv//iv\ Ta//Fr//$

Platinum is combination of the blond (d^B), ivory (*iv*), frosty (*Fr*) and tangerine (*Ta*) genes. The head and breast is white and the wings and back is a dusty pewter grey. The neck ring is a silvery-gray and the eyes are dark. As in all other combinations that include the ivory gene, the iris is mottled. Platinum is quite rare, likely due to the number of genes that must be present to produce this color.



Roan

D+// ry//ry Fr//

Roan is a combination of the frosty (Fr) and rosy (ry) genes. It resembles a diluted or pastel rosy. The head and breast are a dusty rose color and the wings and back are a soft tan. The neck ring is black. The coloring grows lighter as it approaches the tail.



Rosy

D+// ry//ry

On a rosy bird, the back and wings are a rich orange color and the head and breast are the rose color of the wild-type. The neck ring is black and the bill can be either light or dark. The rosy is often confused with tangerine (Ta) and has likely been interbred many times, perhaps causing the grey neck ring in many tangerine birds. The rosy (ry) gene is recessive and is involved in creating a number of different color varieties.



Silky

L//

The silky (L) gene causes the feathers to have a texture that is actually more like that of hair. The barbs which keep feathers smooth and straight are not present on silky feathers as illustrated by the inset photo and the comparison photo below of a normal and a silky feather. Because of this, silky birds do not fly well and tame quickly. The silky gene is co-dominant. Silky birds should always be mated to a normal-feathered bird. When silky is mated to silky, 25% of the young will have a feather condition referred to as “super silky,” where the feathers are little more than spines; creating a grotesque, near-bald bird. Any color variety may be produced as silky as illustrated by the orange whiteback silky in the main photo.





Sunkist

$d^B//ry//ry\ Fr//$

Sunkist is a combination of the blond (d^B), rosy (ry) and frosty (Fr) genes. The color is a gentle peach color from head to tail, lightening a bit toward the tail. The neck ring is brown and the bill is light.



Tangerine

D+// Ta//

Tangerine is a rich rusty orange color on the back and wings with a violet head and breast. The flight feathers and neck ring can be varying shades from white to grey. The eyes are dark orange. The tangerine (Ta) gene is co-dominant and is involved in creating a number of other color varieties.



Tangerine Pearled

D+// Ta//Ta

Tangerine pearled is caused by a “double dose” of the tangerine (Ta) gene which causes the pearling effect. In this bird the head and breast are violet and the wings, back and tail are basically white with rich orange pearling. The neck ring is white and the eyes are rusty brown.



Tangerine Whiteback

D+// Ta//Ta M//M

Tangerine whiteback is caused by a “double dose” of the tangerine (Ta) gene which causes the pearling effect. It is also thought that there is a modifier (M) gene at work which causes the pearling to be extreme to the point of the back being white instead of pearled (inset photo). This bird is basically a tangerine pearled with a completely white back.



Tufted

Tf//

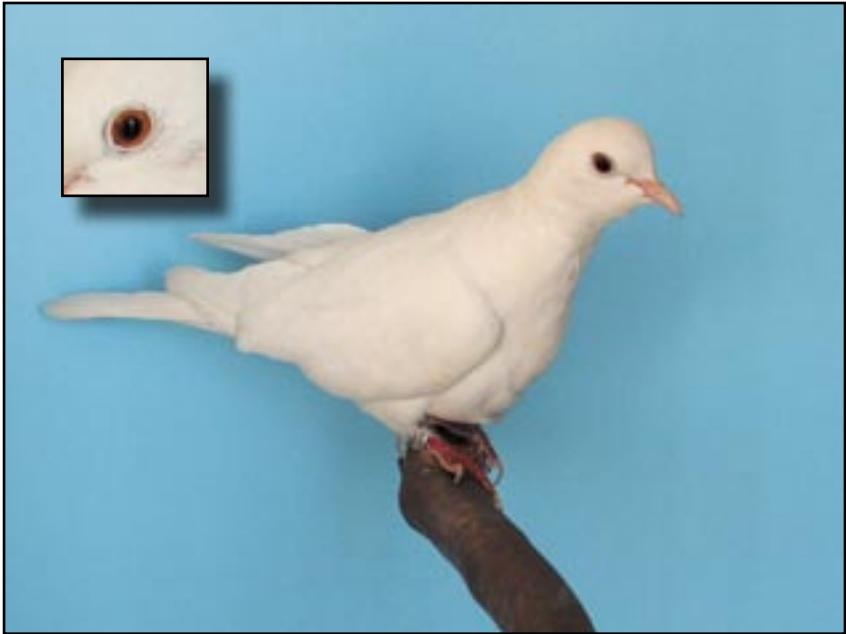
The tufted (Tf) gene causes the feathers on the forehead to reverse their normal orientation and point forward in a sort of tuft. The tufted gene is still fairly new in the U.S. and appears to be dominant with variable expressivity. Tufts can be very pronounced or little more than small bumps on the forehead. Any color variety may be produced as tufted as illustrated by the photos of both white and rosy.



Violet Neck

D+// Ta//Ta// Fr// M//M

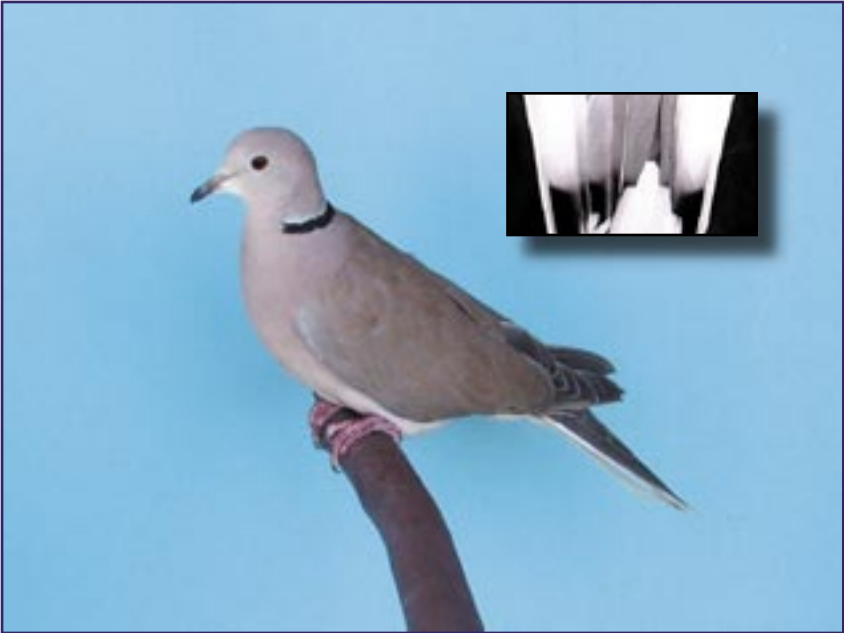
Violet neck is a combination of the frosty (Fr) and tangerine (Ta) genes with a "double dose" of the tangerine gene. It is also thought that there is a modifier (M) gene at work. The head and breast are a violet and the body, wings and back are white. There are often splashes of tangerine pearling on the shoulders. The neck ring is white and there is often a white patch on the top of the head forming a sort of "cap".



White

$d^W//$

White Ringnecks are completely white from head to tail except for a very faint, cream-colored neck ring and under-tail bar, often called a “tea stain.” The eyes are red-orange. It is this color that is perhaps the most well-known throughout the world. The white dove is a symbol of peace to nearly every culture. It is little known that the immensely popular white dove is in all actuality a Ringneck Dove. When “white doves” are released during special occasions, those birds are not really white doves. They are white-colored domestic pigeons that are trained to return to their home. The white (d^W) gene is recessive and is sex-linked.

**Wild-Type (Dark)**

D+//

The wild-type or dark Ringneck Dove is dark grey and brown on the body, wings and tail. The head and breast are a violet or rose color and the neck ring is black with a white outline. The eyes are dark reddish brown. This is the basic coloration of the Ringneck Dove and the standard by which all other color varieties are measured. The dark (D+) gene is located on the sex chromosome and is directly affected by the other two sex-linked genes, blond (d^B) and white (d^W), which cause varying degrees of dilution easily seen when looking at the undertail bar (inset photo). The dark (D+) gene is dominant to both blond (d^B) and white (d^W).

The purpose of this chart is to offer a quick graphic representation of which genes are involved with each color or trait.

Color/Trait	Visual Genes				Possible Genes
Albino		al//al			D+// = Dark (Wild-Type)
Apricot	D+//	Ta//	iv//iv		d ^B // = Blond (Fawn)
Ash	d ^B //	Ta//	Fr//		d ^W // = White
Frosty Ash Pearled	D+//	Ta//	Fr//		al// = Albino
Blond (Fawn)	d ^B //				iv// = Ivory
Bulleyed White	d ^W //	pi//pi			ry// = Rosy
Cream	D+//	iv//iv	ry//ry		Ta// = Tangerine
Crested		cr//cr			Fr// = Frosty
Blond Frosty	d ^B //	Fr//			pi// = Pied
Dark Frosty	D+//	Fr//			L// = Silky
Ice	D+//	Fr//	pi//pi		Tf// = Tufted
Dark Ivory	D+//	iv//iv			cr// = Crested
Show Ivory	d ^B //	iv//iv			M// = Modifier
Silver Ivory	D+//	iv//iv	Fr//		<p>>D+, d^B and d^W are located on the sex chromosome. Since females have only one sex chromosome, they cannot carry d^B and d^W hidden.</p> <p>>d^B is dominant to d^W but recessive to D+.</p> <p>>All genes located on the sex chromosome are listed in the far-left column of the Genotype grid.</p> <p>>pi, L, Tf, and cr do not affect color and may be produced in any color.</p> <p>>al//al masks all other homozygous color genes.</p> <p>>All genes that represent traits or colors that may be represented, regardless of genotype, are listed in the second column of the Genotype grid.</p> <p>>Fr//Fr seems to be fatal.</p> <p>>L//L produces "super silky," an undesirable feather condition.</p> <p>>M// is a modifier gene that affects the extent of pearling on Ta//Ta creating the "whiteback" condition.</p>
Orange	d ^B //	Ta//			
Orange Neck	d ^B //	Ta//Ta	Fr//	M//M	
Orange Pearled	d ^B //	Ta//Ta	M//		
Orange Whiteback	d ^B //	Ta//Ta	M//M		
Peach	d ^B //	ry//ry			
Pied		pi//pi			
Pink	d ^W //	Ta//			
Platinum	D+//	iv//iv	Ta//	Fr//	
Roan	D+//	ry//ry	Fr//		
Rosy	D+//	ry//ry			
Silky		L//			
Sunkist	d ^B //	ry//ry	Fr//		
Tangerine	D+//	Ta//			
Tangerine Pearled	D+//	Ta//Ta	M//		
Tangerine Whiteback	D+//	Ta//Ta	M//M		
Tufted		Tf//			
Violet Neck	D+//	Ta//Ta	Fr//	M//M	
White	d ^W //				
Wild-Type (Dark)	D+//				

The following four articles include an extensive treatment of Ringneck Dove genetics by John Fowler of Houston, Texas. John has been studying Ringneck Dove genetics for many years and has produced a number of the most unusual color varieties. Though there may be some overlap between the three articles, it was thought best to print them in their entirety as originally published in the Doveline newsletter of the American Dove Association.

Definitions

It is helpful to understand a few basics of genetics, before proceeding to look at the various mutations in the Ringneck Dove (*Streptopelia risoria*) and the expected outcome from various mutation crosses. We will start with some simple definitions, which will hopefully create some familiarity with terms. When we are comfortable with the terms, then the subject of genetics doesn't seem quite so difficult.

Genes are made up of DNA and control the transmission of hereditary characteristics. The expression of the hereditary characteristics -- which for our purposes will be the plumage color -- is called the **phenotype**. The **genotype** is the genetic makeup of the individual bird. As we will see later, the genotype may vary, while still producing the same phenotype.

The color standard of reference is the wild type or normal which is a Dark. The plumage is a dark gray with a distinct violet head and breast. The 40-plus color mutations come from this wild-type or dark color. In the process of mutation, a gene is changed into two or more alternative forms called alleles. Alleles are one of a group of genes that occur at a given locus on the chromo-

some. The terms "gene" and "allele" are sometimes used interchangeably, depending on emphasis of meaning.

Chromosomes are located within the nucleus of a cell and carry the genes. There are two categories of chromosomes -- autosomes and sex chromosomes. Autosomes are any chromosomes, other than sex chromosomes. Sex is determined by a heteromorphic (meaning dissimilar) pair of chromosomes called sex chromosomes. In mammals, these chromosomes are labeled X and Y. A male mammal has the XY and a female the XX complement. In birds, not only is the complement of the sex chromosomes the opposite of mammals, but geneticists also assign a different lettering to make the distinction. The letters used are Z and W. A male dove is ZZ, while the female is ZW. The important thing to remember is that the W chromosome carries no known active genes. This is important to know when we get to the sex-linked genes.

A genetic difference is produced by a pair of genes -- one received from the male parent, and one received by the female parent. (This is true except for the sex-linked genes, where the difference in female birds is the result only of the gene on the Z chromosome.) If both genes are identical, the genetic makeup is called homozygous. If the pair of genes is different, then it is called heterozygous.

A **dominant** gene is one that can express itself to the same degree, either in the homozygous or heterozygous state hiding an alternative form. A gene that can express itself only in the homozygous state is referred to as a recessive gene. There is also a condition called codominance, which exists for some

genes. This means that gene has the ability to express itself to some degree in the heterozygous state. Tangerine is a proven codominant gene. Frosty is very likely a codominant gene, but that is not yet proven.

All the 40-plus color varieties are mutant forms of various interactions and dilutions.

Sex-Linked Genes

A sex-linked gene is any gene located on the sex chromosome or the “Z” chromosome. The male Ringneck has two Z chromosomes. Females have only one Z plus a “W” (W means no chromosome). There are three genes (alleles) located on the sex chromosome. An allele is an alternative form of a gene pair. The three alleles (alternative genes) located on the sex chromosome are dark, blond, or white. The wild type or normal is the color standard of reference in the Ringneck Dove (*Streptopelia risoria*). This color is a dark gray with a violet head and breast. Blond can be thought of as a dilute and white as an extreme dilute of the normal color.

Dark is dominant to both blond and white. Blond is dominant to white. Any two of the three alleles can be carried on the two Z chromosomes of the male. The dark male may carry two dark alleles and is therefore homozygous dark or he may carry a dark and a blond or white allele and is therefore heterozygous dark. The dark female will carry only the dark allele on their single Z chromosome. The single allele condition is referred to as hemizygous in contrast to the homozygous or heterozygous possibilities of the male.

When the egg is fertilized, the embryo receives half of its genetic makeup from the male and half from the female. Dur-

ing fertilization, one sex chromosome from the male is combined with one sex chromosome from the female. Because each bird has two chromosomes, which make up the chromosomal pair, there will be four possible outcomes from any mating.

Because dark is the dominant allele, a homozygous dark male mated to a dark or blond or white female will produce only dark offspring. The male offspring from the homozygous dark male mated to the blond or white will be heterozygous dark (they carry either blond or white). A homozygous blond male mated to a blond or white female will produce only blond offspring, with the male offspring from the blond male to white female being heterozygous blond (carrying white).

A useful tool (because it is depicted graphically) to determine the results when using a dark heterozygous male mated to a female of any of the three sex-linked colors is the Punnett Square. First, let's establish the gene symbols we will be using:

D⁺ = Dark or wild-type or normal
 d^B = Blond (recessive to D⁺)
 d^W = White (recessive to D⁺ or d^B)
 W = W chromosome (which signifies a female and lacks the “d” locus)

The sex-linked locus is called the “d” locus because of the “dilution” effect of the two mutants, blond and white. The upper-case letters indicate a degree of dominance. The lower-case letters are used for a recessive gene. Superscript letters are used to identify the multiple alleles (D⁺ for dark, d^B for blond, d^W for white).

Using these symbols, the genotype for a dark, heterozygous white male is D⁺//d^W.

The genotype for a blond female is $d^B//W$. The following example is the Punnet Square for the “d” locus, when these two birds are paired.

Here’s the Punnet Square for the “d” locus. We will place the male gametes across the top horizontal of the square and the female gamete down the left vertical of the square.

	D+	d^W
d^B	$D+//d^B$	$d^B//d^W$
W	$D+//W$	$d^W//W$

- $\frac{1}{4}$ $D+//d^B$ = Dark (heterozygous blond) male
- $\frac{1}{4}$ $d^B//d^W$ = Blond (heterozygous white) male
- $\frac{1}{4}$ $D+//W$ = Dark female
- $\frac{1}{4}$ $d^W//W$ = White female

From these results, you see that females show the sex-linked gene they receive from their father. Selective breeding then allows you to determine the sex at hatching. A dark (or blond) female mated to a white male will have white daughters and dark (or blond) sons. Likewise, a dark female mated to a blond male or (white male) will have dark sons and blond (or white) daughters.

Autosomal Genes

Genes are made up of DNA and control the transmission of hereditary characteristics. The expression of the hereditary characteristics -- which for our purposes will be the plumage color -- is called the phenotype. The genotype is the genetic makeup of the individual bird. As we will see later, the genotype may vary, while still producing the same

phenotype.

Chromosomes are located within the nucleus of a cell and carry the genes. There are two categories of chromosomes: autosomes and sex chromosomes. Autosomes are any chromosome other than sex chromosomes. There are four autosomal recessive genes for color in the Ringneck Dove. These four include: albino (gene symbol = al), ivory (gene symbol = iv), pied (gene symbol = pi), and rosy (gene symbol = ry). Tangerine (gene symbol = Ta) and frosty (gene symbol = Fr) are autosomal co-dominant genes.

Autosomal recessives: Since autosomes occur in pairs (unlike the sex chromosomes), both males and females have equal numbers of genes on the autosomes. Most of the autosomal genes are recessive and require that both mutant genes be present if the mutant color is to be expressed. For these recessive mutants, the nonmutant allele is the dark (wild-type) allele. The dark (wild-type) phenotype really is not only sex-linked, but results from the normal color allele at any locus with a mutant color. The allele to albino is dark. The allele to ivory is dark. The allele to pied is dark. The allele to rosy is dark. When this wild-type allele is present on one chromosome of a pair, the dark (wild-type) phenotype will be displayed. This is a heterozygous condition.

For example: a cross between a dark (wild-type) male and a pied female will produce all dark offspring. All these dark offspring will be heterozygous carriers of pied. The same will be true if the cross is between a dark and any of the other single mutants -- albino, ivory, or rosy. If we cross these heterozygous darks, the result will be offspring produced in a theoretical 1:2:1 ratio. The

following Punnet Square shows this graphically. We will use “+” to represent the dark allele (wild-type) and “pi” to represent the pied allele. The slash mark in the diagram stands for the chromosome on which the “+” or “pi” allele is located. We will place the male gametes across the top horizontal of the square and the female gamete down the left vertical of the square.

	+	pi
+	+//+	pi//+
pi	pi//+	pi//pi

¼ +//+ = Homozygous Dark
 ½ pi//+ = Heterozygous Dark
 ¼ pi//pi = Pied

Three of four offspring will show as dark. Two of the three will be heterozygous dark//pied. The homozygous recessive will show as a pied. This ratio is the expectation of the average and may take more than four offspring to prove true.

Autosomal Dominants: Frosty and tangerine are codominants and should show in almost any color except albino. The color, tangerine, is produced by a heterozygous genotype (Ta//+), while the color, tangerine pearled, is produced by a homozygous genotype (Ta//Ta).

The color frosty (Fr//+) is seen in the heterozygous genotype. The homozygous frosty (Fr//Fr) has proven to be lethal with young usually pipping the shell before dying. The frosty gene has the general action of lightening the wild-type color.

Ringneck Doves

Prediction Method

Every breeder wishes to know what the possible offspring are from a particular cross. In this article I want to share a simple method any breeder can use to determine possible results when the genotype of the parents is known. This article will utilize what we have learned in the previous articles. At any time, you may wish to refer back to the previous articles.

The wild-type or normal is the color standard of reference in the Ringneck Dove (*Streptopelia risoria*). This color is a dark gray with a violet head and breast. At the sex-linked locus there are three alleles -- Dark, blond, and white. The normal color (wild type) is dark. Blond can be thought of as a dilute and white as an extreme dilute of the normal color. The gene symbols we will be using for the sex-linked locus are:

- D+ = Dark or wild-type or normal
- d^B = Blond (recessive to D+)
- d^W = White (recessive to D+ or d^B)
- W = W chromosome (which signifies a female and lacks the “d” locus)

There are four autosomal recessive genes for color in the Ringneck Dove. These four include: albino (gene symbol = al), ivory (gene symbol = iv), pied (gene symbol = pi), and rosy (gene symbol = ry). Tangerine (gene symbol = Ta) and frosty (gene symbol - Fr) are co-dominant genes.

The accepted method for symbolizing genes is small letters for recessive alleles and capitals for dominant alleles. Remember that the nonmutant allele at any locus is the wild-type or normal allele. It is symbolized by a “+”. A slash mark (/) will be used to symbolize the chromosome on which the allele is located.

In this example, we will use a Dark cock heterozygous for white at the sex-linked locus and heterozygous for pied and rosy at the autosomal loci. The hen is a blond at the sex-linked locus and heterozygous for pied and rosy at the autosomal loci. We will work a Punnett square for each locus, and then apply the arithmetic method as we combine the gene pairs to determine offspring probability.

At the sex-linked locus, the genotype for the male will be $D+//d^W$ and for the female will be $d^B//W$. Here's the Punnett square for this locus. The male gametes are placed across the top horizontal of the square, and the female gamete down the left vertical of the square.

	D+	d^W
d^B	D+//d^B	d^B//d^W
W	D+//W	d^W//W

- 1/4 $D+//d^B$ = Dark (heterozygous blond) male
- 1/4 $d^B//d^W$ = Blond (heterozygous white) male
- 1/4 $D+//W$ = Dark female
- 1/4 $d^W//W$ = White female

At the autosomal loci, the genotype of both sexes will be $+//ry$ and $+//pi$.

Here's the Punnett Square for the rosy locus.

	+	ry
+	+//+	+//ry
ry	+//ry	ry//ry

- 1/4 $+//+$ = Homozygous Dark
- 1/2 $pi//+$ = Heterozygous Dark
- 1/4 $ry//ry$ = Rosy
- Or 3/4 wild type ($+//?ry$), 1/4 rosy ($ry//ry$)

Here's the Punnett Square for the pied locus.

	+	pi
+	+//+	+//pi
pi	+//pi	pi//pi

- 1/4 $+//+$ = Homozygous Dark
- 1/2 $pi//+$ = Heterozygous Dark
- 1/4 $pi//pi$ = Pied

Now we will use the arithmetic method of multiplying the fractions as we combine the gene pairs. There are 64 possible genotypes and 16 possible phenotypes. For the sake of simplicity, we will only do the combination of the 16 phenotypes.

The example at the right is called a dihybrid cross. A dihybrid cross is a cross in which both parents are heterozygous for two traits. You notice that the phenotypic ratio for a dihybrid cross is 9:3:3:1. This ratio is the expectation of the average and will prove true over many offspring.



A rosy pied Ringneck Dove. Photo by Greg Sweet.

$(1/4 D+//d^B)(3/4 +//?ry)(3/4 +//?pi) = 9/64$ Dark Male
 $\quad \quad \quad \backslash(1/4 pi//pi) = 3/64$ Dark Pied Male
 $\quad \quad \quad \backslash(1/4 ry//ry)(3/4 +//?pi) = 3/64$ Dark Rosy Male
 $\quad \quad \quad \quad \quad \quad \backslash(1/4 pi//pi) = 1/64$ Dark Rosy Pied Male

 $(1/4 d^B//d^W)(3/4 +//?ry)(3/4 +//?pi) = 9/64$ Blond Male
 $\quad \quad \quad \backslash(1/4 pi//pi) = 3/64$ Blond Pied Male
 $\quad \quad \quad \backslash(1/4 ry//ry)(3/4 +//?pi) = 3/64$ Blond Rosy (Peach) Male
 $\quad \quad \quad \quad \quad \quad \backslash(1/4 pi//pi) = 1/64$ Blond Rosy Pied Male

 $(1/4 D+//W)(3/4 +//?ry)(3/4 +//?pi) = 9/64$ Dark Female
 $\quad \quad \quad \backslash(1/4 pi//pi) = 3/64$ Dark Pied Female
 $\quad \quad \quad \backslash(1/4 ry//ry)(3/4 +//?pi) = 3/64$ Dark Rosy Female
 $\quad \quad \quad \quad \quad \quad \backslash(1/4 pi//pi) = 1/64$ Dark Rosy Pied Female

 $(1/4 d^W//W)(3/4 +//?ry)(3/4 +//?pi) = 9/64$ White Female
 $\quad \quad \quad \backslash(1/4 pi//pi) = 3/64$ White Pied (Bulleyed White) Female
 $\quad \quad \quad \backslash(1/4 ry//ry)(3/4 +//?pi) = 3/64$ White Rosy (Clear White) Female
 $\quad \quad \quad \quad \quad \quad \backslash(1/4 pi//pi) = 1/64$ White Rosy Pied (Bulleyed White) Female



This genetic oddity, called "mosaic," was produced by Myron Turk of Wisconsin. The left half of this bird is tangerine pearl and the right half is violet neck. This effect is caused by two sperm fertilizing the same egg. The odds of this happening are truly astronomical. This is the first time it has ever been recorded in Ringneck Doves but has happened several times in domestic pigeons.

Showing Ringneck Doves is growing in popularity each year and is supported by the American Dove Association (ADA), which sponsors a Master Breeder award given to those who earn points by showing and placing birds. The largest show sponsored by the ADA is the National Young Bird Show (NYBS), held each October in Louisville, Kentucky. The NYBS exhibits literally thousands of birds, which include nearly every imaginable breed of domestic pigeon, as well as both Ringneck and Diamond doves. The ADA also sponsors other shows across the U.S. that meet specific criteria, as outlined in their constitution and bylaws.



Judges take their responsibility very seriously and know the standard for the birds they are judging very well.

Doves are typically shown in color classes, where all birds of the same phenotype compete for the prize of “best in color.” The winners of each color class then compete for the “best of show” prize. Judges are chosen from the most experienced dove keepers and take their task quite seriously. Showing doves is an enjoyable hobby and allows for wonderful opportunities to communicate with many other “dove people” throughout the world. When preparing to show



A beautiful ivory Ringneck Dove that won the “Best in Color” award at the 2004 National Young Bird Show in Louisville, Kentucky.

a particular bird, it is important that you make the bird look its best. To aid in this, you should ensure that your bird has plenty of room in its cage to avoid damage to feathers from the sides of the cage when it is perching or spreading its wings. Pay close attention to the cleanliness of your cage. If you are not careful, the feathers on your bird may become soiled in a cage that is not kept sufficiently clean.

Many who show their doves begin, early in the life of the birds, to get them used to close human presence and periodic touching. When being judged at a show, each bird will need to be transferred from its holding pen to the judging pen and if it is used to human contact, the dove will exhibit little alarm, and it will more likely retain its groomed appearance.

A “trick of the trade” is to make sure to put talcum powder (baby powder) on your hands when handling a show bird to keep sweat and oils from causing the feathers to mat and stick. You may also want to keep on hand a spray bottle filled with water to mist the bird to encourage preening just prior to and during a show.

Ringneck Dove Standard

From the American Dove Association

General Conditions: Since the dove by its very nature, is a fast flyer, it should have, when at rest on a perch or the floor, a racy, streamlined and alert look to its carriage and body. Feathering should be smooth and tight over the entire body. Feet and legs should be free of feathering, clean and the skin shiny and bright. A healthy bird never sits hunched up, eyes closed and feathers ruffled. The body should be firm and solid.

Posture: The stance should be roughly at a forty-five degree angle when the bird is standing quietly. The tail may touch the door of the judging coop and not crouching. In this position the dove should be standing approximately six inches high and about ten to eleven inches long, from beak tip to the end of the tail

Head: It should be a little long rather than short but not flat-headed, but with a smooth round curve. There should be a gradual break at the beak and graceful curve to the top of the head, then a graceful curve down the back neckline with no protruding feathers. The gullet should have a smooth and continual curve.

Eyes: These may vary in color according to the color marking of the bird. Example: the Fawn will have orange eyes, the White, orange with a reddish tint, the Pied dove will have black eyes, often called "bull" eyes. The Wild dove will have orange eyes sometimes darker than the Fawn. Albinos (true) will have pink eyes. All doves will have very fine slate-colored eye cere. The location of the eye should be very near the center of the head.

Beak: It should be long, short being undesirable, and even with the eye. Fawn doves will have a very dark beak, Wild almost black, Peach lighter, and White will have a flesh colored beak, while the Pied will have a light colored beak with a dark stain on the tip. There should be very little wattle protrusion on the beak of any dove.

Neck: A shorter neck is more desirable than a long, rangy one, tapering from the body to the head in a shallow, smooth curve. No frill feathers on the nape of the neck. On the Ringneck dove, the ring should start right below the eye and continue around the back of the neck to just below the other eye. On all colored doves this ring should be bordered by a fine line of white feathers. Some White doves will also show a semblance of this ring in white feathers which may be somewhat at variation with the smooth pattern of the rest of the neck feathering.

Body: The body should be up to ten or eleven inches in length overall from beak tip to the end of the tail, giving a long look rather than short. The widest part of the body should be across the wing butts, gracefully tapering to one feather width in the tail. There should be no bulging in the chest area, no ill feathers, no wing butts protruding to break the smooth general curving of any part of the body conformation. In general the body should be well proportioned and nicely streamlined to present a pleasing appearance to the eye. The bird should be fully feathered and free of vermin, dirt and feather lice. Feathers should be tight and close to the body. Care must be used in handling the bird to avoid feather loss and damage. Color of feathers to be in accordance with the accepted standard.

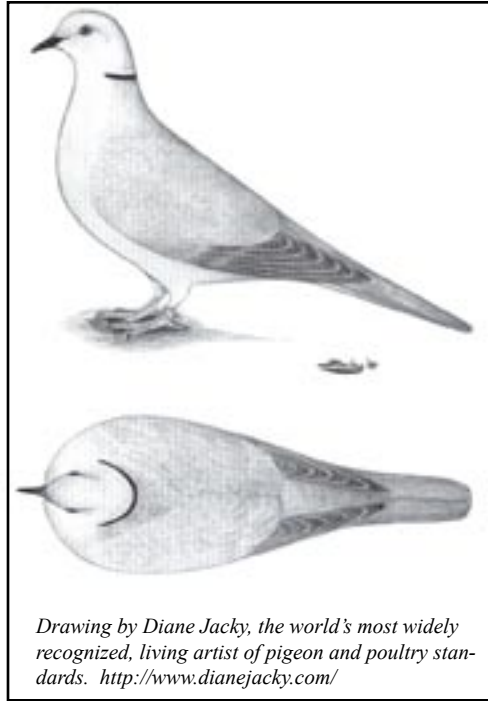
Wings: Wings should be closely folded against the body with the coverts well over-lapping the back and with no sideboards sticking up to mar the smooth covering on the back. The wing, when outstretched should not be pointed but should be slightly rounded at the extreme end. When it

is folded against the body, the wing tip should be approximately two to three inches from the end of tail and not drag below it. Flight feathers should be at least ten on each wing, after a full molt.

Legs: Legs should be short and sturdy, bright red in color and free of any feathers or signs of leg mites. When the bird stands at ease, the feet should be slightly extended forward as if it is ready to take off. From the side view, the legs should be parallel.

Rump: This should be almost straight with no hump to mar the smooth line of the body contour from the nape of the neck to the end of the tail.

Tail: It should have twelve strong feathers, extending beyond the wing tips by two to three inches. Split tails are not desirable.



Drawing by Diane Jacky, the world's most widely recognized, living artist of pigeon and poultry standards. <http://www.dianejacky.com/>

Silky: The body of the Silky dove is like any dove of the Ringneck variety, the only difference being the feathering and that sideboards are acceptable. The inner web of the feather is connected to the feather shaft, but the outer web is not, causing the Silky effect.

Tufted: The body of the (nasal) Tufted dove should be proportionate to all other areas of the Ringneck Standard except for the Tuft. The Tuft should begin directly above the center of the eyes on the top of the skull. The feathers of the tuft should grow forward toward the beak. The tuft should be uniform, even and symmetrical from all angles (front, above and sides). The Tuft can vary from rolling down the fore skull of the bird toward the break to fanning out vertically between the eyes. The feather of the Tuft may cover the bird's nose. The feathers of the Tuft should be (1/2 cm to 1 cm) in length.

Crested: The body of the (rear) Crested dove should be proportionate to all other areas of the Ringneck Standard except for the crest. The crest should be vertical peak along the back of the skull and begin on the back of the neck just above the neck ring. There the feathers should begin to curl upward toward the head. The curling or creating should continue up the back of the neck in an unbroken line toward the pinnacle of the Crest on the back skull. The pinnacle of the Crest should be even with the center of the eye. The Crest should appear even, uniform, and symmetrical from all angles (front, above and sides). The feathers of the Crest should be (1-1/2 cm) from the back of the skull itself.





Left: A young blond silky Ringneck Dove. Notice the fuzzy or hairy effect caused by the silky gene. Photo by Greg Sweet.

Right: A curious white Ringneck Dove..

altricial

Altricial birds are hatched with their eyes closed, with no feathers and completely dependent on their parents. Other birds, in addition to doves, which are altricial include Robins, Starlings and Jays.

aviary

A large cage or group of cages specifically used to house birds. Aviaries may be constructed both outdoors and indoors.

bonding

The process during which a male and a female dove spend time together and accept each other as mates. The time it takes for a pair of doves to bond varies according to the preference of each individual bird but, in the case of Ringneck Doves, typically takes between two and four weeks.

bow coo

The name of a behavior exhibited by male Ringneck Doves when trying to interest a female. While cooing loudly, male Ringnecks repeatedly stand up straight and tall and then dramatically bow to the female as though worshipping her.

cloaca

The opening through which birds eliminate waste and through which males fertilize the eggs of females.

co-dominant

A term that refers to a gene that has the ability to express itself to some degree in the heterozygous state when only one copy of the gene is present.

coo

The vocalization of doves. There are several different types of coos used by Ringneck doves, each with different meanings. Male Ringneck Doves coo more often than females and are much louder. Nearly all occasions in which male doves coo have to do with breeding behavior.

Ringneck Doves

crop

An organ in the digestive system of a bird which is located in the neck. It is where food is stored prior to entering the stomach.

crop milk

A white, milky substance secreted into the crops of parent doves used to feed their young.

dominant gene

A term that refers to a gene that has the ability to express itself to fully in both the homozygous and heterozygous state.

driving

The behavior demonstrated by male doves when trying to get a female dove to accept a nesting site and lay eggs. Males typically drive, or chase, the females to the nest after the act of mating has been completed.

dummy egg

An artificial egg, usually made of wood or plastic, used to replace real eggs in an effort to slow down the breeding cycle, thus protecting the health and energy of the parent doves.

fledge

The name given to the time when young birds leave the nest for the first time.

gene

Genes are made of DNA and control hereditary characteristics passed on from generation to generation.

genotype

A term referring to the genetic makeup of a living organism.

grit

A compound made up of ground minerals that resembles sand. Grit may assist in the grinding of food and is an excellent way for birds to obtain minerals in their diet, especially calcium.

incubation

The process and period of time when parent doves sit on eggs to keep them warm and at the proper temperature for the embryo inside the eggs.

leg band

A ring made of plastic or metal which is placed on the leg of young doves to be used as a means of identification throughout the life of the bird. Leg bands are often stamped with identifying information such as the initials of the breeder, the hatching year and the state in which the breeder resides.

nesting container

A container offered to a pair of doves in which they will build a nest. Nesting containers can be nearly anything bowl shaped and are often old plastic dishes or wicker baskets.

Phenotype

The term used to describe the genes visually displayed on a bird.

photoperiod

The amount of time that a dove is exposed to daylight. In order for doves to breed freely they should be exposed to daylight for 14-16 uninterrupted hours daily.

precocial

Precocial birds are hatched as nearly self-dependent chicks. They have the ability to peck the ground for food and rely on their parents only for warmth and protection. Precocial birds include Chickens, Ducks and Quail.

quarantine

The period of time during which new birds are kept away from already established birds in an effort to prevent the spread of potential disease.

recessive gene

A term that refers to a gene that has the ability to express itself in the homozygous state when two copies of the gene are present.

sex-linked

This term refers to any gene located on the sex chromosome. Male Ringnecks have two sex chromosomes. Females have only one. The three genes in Ringneck Doves that are located on the sex chromosome are Dark, Blond and White. Since females have only one sex chromosome, only one gene is required for the color effect to be displayed.

wild-type

This term is applied to the coloring that a Ringneck Dove would display without any altering genes. A wild type Ringneck Dove has a brownish body with grayish-brown wings and a rose colored head and breast.

wing flutter

This term refers to a behavior demonstrated during the breeding process where the male Ringneck Dove is trying to show a suitable nesting site to a female. The male positions himself with his head bowed low and tail pointing high and then very lightly flutters his wings while cooing loudly.



A violet neck Ringneck in the middle of a bow-coo. Photo by Mary Ellen Robinson.

<http://www.dovepage.com>

The personal website of the author. Dovepage.com has been online continuously since 1996 and is devoted to the support of keeping both exotic and domestic doves in captivity. The site includes species information provided by Jeff Downing, care and breeding information, breeder contact information, and the opportunity to purchase dove-related books, cages and supplies.

<http://www.ringneckdove.com>

The personal website of Dr. Wilmer J. Miller, Emeritus Professor of Iowa State University. Dr. Miller's website includes many photographs and extensive information about his years of study of the Ringneck Dove.

<http://www.doveline.com>

Doveline.com is the official website of the American Dove Association. In addition to membership information, the site contains links to other related websites and a frequently asked questions page.

<http://www.internationaldovesociety.com>

The personal website of John Pire. John has compiled extensive information about many different dove species, both domestic and exotic.

<http://www.diamonddove.com>

The personal website of Jeff Downing of Frederick, Maryland. Diamonddove.com is devoted to diamond doves and is filled with information about care, breeding, and color varieties.

<http://www.zebrafinch.com>

The personal website of Garrie Landry of Lafayette, Louisiana. Garrie has a large bird farm with perhaps the largest collection of zebra finches, society finches, and button quail in the US. He also keeps and breeds several exotic dove species.



Happy Family! Photograph by Mary Ellen Robinson.

Many dove keepers find that belonging to clubs and organizations where they can share their dove experiences with others very fulfilling. Below is contact information for the two major dove organizations in North America. There are many other smaller clubs that you can learn about from contacts made through these organizations.



American Dove Association

At the time of this publication, the president of the American Dove Association (ADA) is George Schutt of Lebanon, Tennessee. You may obtain current contact information for the ADA by visiting their website at <http://www.doveline.com>. Membership in the ADA includes an extensive and high-quality bi-monthly newsletter called the Doveline.



Canadian Dove Association

At the time of this publication, the president of the Canadian Dove Association (CDA) is Rick Dawdry. You can contact the Canadian Dove Association at the following address: P.O. Box 135, Plattsville, Ontario, NOJ 1S0 CANADA.



A male ash pearled Ringneck Dove showing a typical defense posture.

I still remember very well the first time I was introduced to keeping doves. While living in Kentucky in 1988, I was visiting an acquaintance that happened to have a new pair of Ringneck Doves in a cage in the living room. While we were admiring and talking about them, we noticed that one of the doves hopped down from the perch and rested on the bottom of the cage. The bird then made a very short hooting sound and ruffled its feathers. After a moment, the dove stood up from where it was sitting on the bottom of the cage, and there was a perfectly shaped little white egg. We were amazed and thrilled to be there at such a moment.

It wasn't until 1990 that I obtained my own first dove. I was living in Salt Lake City, Utah and while visiting a good friend I was again introduced to doves. In his backyard were four large flights that were approximately six feet wide, ten feet long, and ten feet high. Each flight housed a number of doves and quail.

I showed a lot of interest and it wasn't long until he asked if I would like to have a couple of Ringneck Doves. I immediately went home to build a cage in my backyard and, the next day I took possession of a small box which contained my doves.

I then began to almost thirst for information about keeping doves, but found very little. It wasn't until I discovered the American Dove Association that I found a wealth of knowledge and experience in its members.

Currently, there is a growing amount of published information available about several dove species, and it is my hope that this publication, specific to Ringneck Doves, may be useful to new and experienced fanciers alike.

At one point, I amassed a collection of doves which included several pairs of at least 12 separate species at one time. Yet, through it all, the Ringneck Dove was my first love and will likely be my last.

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Above is an excellent example of a homemade breeding cage, with removable dividers, that is used to house individual pairs of Ringneck Doves. Below is an orange whiteback tufted silky male Ringneck. The distinctive curl in the tuft seems to leave little wonder about why he was named 'Elvis' by his owner. Thanks to Greg Sweet for these photos.





Ringneck Doves

A Handbook of Care & Breeding

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