



Q U E E N S L A N D

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VICTORIAN



**CANINE
ASSOCIATION
INC.**
GUIDELINES FOR BREEDERS

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INDEX

WHY BREED?	3
AGE, HEALTH AND CARE OF BREEDING STOCK.....	5
HEREDITARY DISEASES.....	7
Concern about hereditary diseases	7
Obligations under the Code of Ethics and Code of Practice	7
Recommended action for breeders in relation to hereditary diseases.....	8
BASIC GENETICS	9
The Genetic Material.....	9
Dominant/Recessive Mode of Inheritance.....	9
Other Modes of Inheritance.....	11
Genetic Testing and DNA	12
THE BROOD BITCH.....	13
SELECTING A STUD DOG.....	15
CONCEPTION AND PREGNANCY.....	17
FEEDING THE BITCH: PREGNANCY TO WEANING.....	19
What to feed.....	19
And when to feed	19
Summary	20
WHELPING THE LITTER	21
Provision of a whelping box.....	21
Whelping.....	21
Clues that whelping is imminent.....	22
Whelping - First stage of labour.....	22
Second stage of labour.....	22
Third stage of labour.....	23
Post partum.....	23
Summary	24
WEANING, SELECTION AND SALE OF PUPPIES	25
PUPPY SOCIALISATION.....	27
Training.....	27
RESPONSIBILITIES OF THE BREEDER.....	29
RECOMMENDED READING.....	31

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WHY BREED?

Breeding dogs is a venture which should not be embarked upon without full and proper consideration to the many important facets and requirements involved.

High on the list of essentials is TIME. Puppies will need feeding four or five times a day, and will need someone on hand to monitor the ambient temperature, whether it is too hot or cold, and to adjust the temperature of the puppies accordingly. If there is nobody available to attend to the puppies during the day, please forget about breeding.

The common concept that pure bred puppies are a means of making money is, in a reality, a misconception and, alone, not a valid reason to bring otherwise unwanted dogs into being.

As members of our State Body we should all be well aware of the Code of Ethics which all members are required to follow, the first of which is the statement, "I shall breed only to improve the breed ..."

Generally members venture into breeding only after having tasted moderate success with a pure bred puppy in the show ring. As their dog matures they are drawn towards continuing their success with progeny of their young winner. This is acceptable, as they would probably have obtained their first show dog from a reputable breeder who is able to guide them through their first breeding experience, just as they probably guided them through the first show experiences.

Generally a poor specimen who had failed to earn any consistent success will also tempt its owner into the breeding experience, in the hope that something better could be produced if a winning mate were chosen. Unfortunately this decision will generally lead its breeders down the path to failure. Although the first Ethic is being followed, its chance of success is minimal when compared to that of the winning competitor, who is already a jump ahead in the race for perfection in competition. When it comes to the question of breeding to improve, if exhibition of the resultant stock is the reason for breeding, then breeding from poor or mediocre stock is a mistake.

If the show ring is not the ultimate aim for the product of your breeding, then there should be a very clear goal set for achievement.

If you were breeding for superior retrieving ability, then it would be patently obvious that the parents of the litter would be chosen with that end in mind. The Police now have in place their own breeding program, based upon traits required in the dogs they work, rather than relying on the hit and miss opportunities previously afforded them by taking in other people's cast off dogs for training. Similarly the Guide Dogs for the Blind and other organisations are now breeding with a definite goal in mind for achievement.

Without very clear ideas and goals set for what you wish to achieve in breeding a litter of ANKC registered puppies, there can be no truly valid reason for doing so if, within the breeding stock you have under your control, the ability to produce your aim does not genetically exist.

Do you wish only to produce a litter of pedigreed puppies for sale as pets? If so, there are still very clear guidelines and demands in the end product, perhaps every bit as stringent as required in a show dog. It is therefore your responsibility to provide for the market a dog which is typical of its breed in appearance, which has a reliable and tractable temperament for simple training, which will not be requiring veterinary attention as a result of unsoundness or heritable problems like hip dysplasia, cataracts, or any of a number of abnormalities which may make the ownership of such a dog a hardship.

Quite simply the reasons for breeding a litter must be clearly perceived and set down as goals for achievement prior to breeding any litter of puppies and there should be a good chance of achieving these goals from the stock we use, based on known factors. It is our responsibility to ascertain that these factors are indeed present before embarking on a breeding venture. Therefore we must make an effort to educate ourselves in order to set our aims and achieve them.

AGE, HEALTH AND CARE OF BREEDING STOCK

If you have decided to have a litter of puppies you must first adhere to the Code of Ethics - "I will breed only for the purpose of improving the standard of the breed, and not for the pet market or any other commercial purpose." There is also a Code of Practice for Hereditary Diseases. You must additionally heed these requirements.

Your bitch's health is paramount. Do not use an, immature bitch. Different breeds mature at different ages, some breeds have rules pertaining to the minimum age a bitch can be bred from. Some States also have in their code of ethics points pertaining to consecutive litters, and also concerning the total number of litters, without prior veterinary advice, that a bitch may whelp. Check with your breed club or governing canine controlling body to find out the average, best age to breed from your bitch. None should ever be bred less than twelve months of age. Let your bitch enjoy being a puppy herself and let Mother Nature mature the bitch so that she will be confident, both mentally and physically, in the role she is about to play.

Many breeds of dogs now require passing certain health check and that these be certified before you can breed your bitch. All animal species (including humans) have genetic defects; by having all breeding stock checked for specific problems before mating will lessen the chances of these problems occurring. So doing 'homework', before you launch yourself and your dog/s into creating life, is your highest priority. Find out which hereditary problems your breed has and which tests should be carried out before breeding. You are legally bound to offer the pups in the best of health.

The demands of producing and feeding a litter of healthy puppies are very exhausting on your bitch. Your bitch should be in the peak of condition, not only during her pregnancy, but also before she is mated. Make sure her vaccinations are up to date before mating and that she has been wormed regularly. It is advisable to worm a bitch in her fifth or sixth week of pregnancy. Roundworms are the most common worms passed from bitch to pups through the milk supply and through the placenta while the pups are still in the bitch. However, correct procedures for worming of puppies should be carried out. Your bitch should be totally free of any parasites, especially fleas.

Because overweight bitches may have problems, both conceiving and whelping, keep your bitch within the correct weight ranges for your breed. Exercise the bitch regularly. A fit and healthy bitch will have strong contractions during whelping. Muscle tone is very important during delivery of her pups.

Some stud dog owners require the bitch to be swabbed before mating. This is a precaution against any foreign bacteria that may be inside the bitch. Swabbing a bitch at the first sign of swelling of the vulva will allow time, if necessary, to clear up any infections before mating.

The stud dog himself should also be in the peak of physical condition before mating. An overweight stud dog may find it difficult to mate naturally. Artificial insemination is now very common for a variety of reasons. The dog and bitch may simply not like each other

and may harm each other if brought together. There may be a risk of infection. The stud dog may live interstate or overseas, frozen and chilled semen is transported easily with maximum safety these days.

HEREDITARY DISEASES

Hereditary disease is only one of the factors to consider in selection of breeding stock, but it is an important one. Hereditary diseases are due to random gene alterations (mutations) occurring as accidents in nature. Once the gene mutations occur they may be passed on from parent to offspring, sometimes hidden but sometimes becoming apparent, resulting in hereditary diseases in the unfortunate affected animals. Because these mutations occur naturally one may ask why we should be concerned about them? Natural selection has been replaced by breeder selection within the limited gene pool of any one breed. As well as taking control of selecting for good traits the breeder must accept the responsibility of selecting against hereditary diseases.

Concern about hereditary diseases

There are real reasons for concern about hereditary diseases:

- (a) They affect the health and welfare of the unfortunate dogs that are affected.
 - some hereditary diseases are life-threatening, e.g. heart and kidney diseases and many are debilitating, e.g. hip dysplasia and blindness;
 - others are at least discomforting and aggravating, e.g. entropion, distichiasis;
 - for the sake of future generations we should aim to breed dogs that are not likely to pass on defective genes causing hereditary disease.
- (b) Concern for future buyers of puppies
 - it is distressing to see the effects of an hereditary disease on a loved pet;
 - cost of treatment is often high;
 - buyers become disillusioned with purebred dogs when their puppies develop hereditary diseases.
- (c) Financial risk to the breeder
 - a breeder who produces a puppy that subsequently becomes affected with an hereditary disease must act responsibly in dealing with the buyer on the matter;
 - breeders are prone to risk of litigation if an affected puppy is produced; a defence is to be able to show that all reasonable care has been taken to avoid hereditary diseases in the breeding program.

Obligations under the Code of Ethics and Code of Practice

The Australian National Kennel Council has a Code of Ethics and a Code of Practice for Hereditary Diseases that provide solid guidelines for breed clubs and breeders in relation to hereditary disease. Breeders are obliged to conform to both Codes. The Code of Ethics includes a clause whereby breeders are required to breed only for improvement of the breed. The Code of Practice for Hereditary Diseases has three main thrusts directed at:

- reducing the incidence of hereditary diseases;
- protecting the purchaser of a puppy;
- protecting the breeder who has made all reasonable efforts to minimise the risk of hereditary diseases.

Legal advice is that the Code of Practice for Hereditary Diseases should be adhered to for the protection of both buyer and seller. Provided the information given is not misleading or deceptive, adherence to the Code should substantially reduce members' exposure to claims such as breach of contract and negligence.

Recommended action for breeders in relation to hereditary diseases

National Breed Councils and Breed Clubs are recognised as the guardians of their breeds and, for the long-term benefit to the breed, breeders should participate in any hereditary disease control programs conducted by these bodies within their breed. Ignorance is no excuse.

- Find out what hereditary diseases, if any, are known to be problems within your breed — ask responsible, experienced people within your breed.
- Find out if there is any known incidence of these diseases within the lines of your dogs, particularly among their parents and siblings.
- Before breeding from your dogs, find out what testing should be done in relation to hereditary diseases.
- Comply with the requirements of the Codes.
- Select against hereditary diseases for the benefit of future generations of the breed, to protect prospective puppy purchasers and to reduce the financial risk to you as a breeder.

Producing a puppy affected by a hereditary disease is not a crime, provided you have made all reasonable efforts to avoid hereditary diseases. The offence is in doing nothing, before and after. Act responsibly for the future of your breed!

BASIC GENETICS

To understand the fundamentals of breeding of dogs and the transmission of inherited characteristics it is important to have a basic knowledge of the science of genetics. Inherited characteristics include quite superficial factors, which are easy to see, such as coat colour, but they also include basic conformation factors, such as bone structure and musculature, and defects such as hereditary diseases. Note also that environmental effects may influence some factors, for example the musculature of a dog will be predetermined by its genes but nutrition and exercise will have significant roles in determining the result.

The inheritance of characteristics may range from simple to extremely complicated. The old adage "Like begets like" is a generalisation that cannot be relied upon. Various inherited factors, good and bad, may be carried in a hidden state in a dog and only revealed in its descendants. Inbreeding (including line-breeding) has been used to concentrate desirable genes, but beware as it also tends to concentrate undesirable genes.

The Genetic Material

The body of each animal is composed of cells that are so small that to be seen they must be viewed under a microscope. Each cell has a central nucleus that contains the genetic material inherited from its parents, the *chromosomes*, which are made of long strands of protein in coils (DNA). The chromosomes are in pairs and one of each pair is inherited from each parent. The dog has 39 pairs of chromosomes, with 39 single chromosomes coming from each parent via the sperm and the ovum to regain the 39 pairs in the resulting offspring. A *gene* is a particular section of a chromosome at a certain location (*locus*) on the chromosome and it has a specific role in determining the development of a certain feature of that animal. Different forms of the one gene are called *alleles*, and may produce different appearances, conditions or behaviour in the animals inheriting them. The total complement of the particular forms of genes that an animal has is termed its *genotype*. Some genes will be masked or modified by others with the result that the appearance of the dog, its *phenotype*, does not indicate its full genetic make-up.

Dominant/Recessive Mode of Inheritance

To illustrate a frequently-seen mode in which inherited characteristics are passed on from parents to their offspring it is useful to take the relatively simple example of the transmission of coat colour in Labrador Retrievers, firstly looking at the inheritance of the basic pigment colours black and the rarer chocolate, and then how yellow is obtained.

Each Labrador dog and bitch has two genes relating to the black/chocolate colour series, one inherited from each parent. These genes are situated at a specific locus on each of a particular chromosome pair. There are two different alleles, one for black pigment and one for chocolate pigment, and, depending on the specific combination, producing black or chocolate coat colour. Black is said to be dominant over chocolate because only one allele for black needs to be present for the animal to be black. For an animal to have a chocolate coat then there must be no gene for black, i.e. both alleles must be for chocolate. Chocolate is said to be recessive to the dominant black. If the dominant allele for black is represented by "B" and the recessive allele for chocolate by "b", then in a Labrador there are three possible genetic combinations:

Possible Phenotype
 Genotypes Appearance

BB Black
 Bb Black
 bb Chocolate.

Where the black allele is present, i.e. BB or Bb, then the animal will be black. Where both alleles are chocolate, i.e. bb, then the animal will be chocolate. Note that while Bb is black in appearance because of the presence of a dominant B, it will pass on either B or b to each offspring depending on chance alone. An animal with the genotype Bb is known as a *carrier* - one that carries a hidden allele but is able to pass it on to its progeny. This is also termed the *heterozygous* condition (Bb), whereas if both genes are the same (BB or bb) the term used is *homozygous*.

If two black-coated carriers (genotype Bb) are mated, each parent is able to pass on either B or b to each offspring. To determine the potential progeny genotypes it is useful to develop a table of the possible combinations of ova (eggs) and sperm as follows:

Possible Offspring Genotypes from a Bb x Bb Mating

		Ova	
		B	b
Sperm	B	BB	Bb
	b	Bb	bb

It can be seen from this table that the expected ratios of genotypes and phenotypes in the progeny are: -

Genotypes: 1 BB : 2 Bb : 1bb
 Phenotypes: 3 black : 1 chocolate

So, if the two black carriers were mated, then according to probability any one offspring would have a 75% chance of being black and a 25% chance of being chocolate. Approximately 75% of the litter would be expected to have the chocolate allele. Also note carefully that a chocolate animal must have received a chocolate allele from each parent. Within any litter these expected ratios may not result, just as the result of tossing a coin 10 times may not result in 5 heads and 5 tails.

Yellow is a common coat colour in Labradors. This colour is produced by the action of a different pair of genes, the Extension or E series, which governs extension of the pigment into the hairs of the coat. For coat colour to be black or chocolate, a dominant allele for extension, represented as E, must be present in the genotype. The recessive e if present in duplicate produces yellow coat, regardless of the black or chocolate genes for pigment, however the skin colour of the nose and lips will indicate the pigment status. This mode

of inheritance is said to be *epistatic*, where one pair of genes over-rides another pair. Try working out the expected progeny phenotype ratio for the mating of two black parents with the same heterozygous genotype BbEe (answer at the end of the chapter). The potential genotypes and phenotypes resulting from the mating are: -

Phenotypes	Genotypes
Black	BBEE, BBee, BbEE, BbEe
Chocolate	bbEE, bbEe
Yellow with black nose	BBee, Bbee
Yellow with chocolate nose... ..	bbee

This exercise is a good example of the variation in potential phenotypes and genotypes in a litter when considering just two pairs of genes. In addition to the basic coat colours above, there are many variations in pigment particle size and shape which produce different shades of colour in chocolates and yellows, and there may be patterns of light and dark over the body, more obvious in the yellows. These are due to modifier genes. Environmental factors such as nutrition and sunlight may produce further minor variations in colour within the three basic coat colours. This illustrates the point that inheritance of what may appear to be a single factor may in fact be the result of the interaction of many genes and environment.

Other Modes of Inheritance

There are various modes of inheritance other than the above, and the more frequently encountered are:

(a) X-linked

Sex is determined via a pair of chromosomes called the *sex chromosomes*. All other chromosomes are known as *autosomes*, and each one of an autosomal pair has the same complement of genes. The sex chromosomes are of two different types known as X, the female chromosome, and Y, the male chromosome. The Y chromosome is much smaller than the X and contains little genetic material. A male has one Y and one X, whereas a female has two X chromosomes. Sex of an offspring is determined by the sire passing on either an X or a Y chromosome: the dam passes on either one of her X chromosomes to each offspring. As well as the obvious sex characteristics inherited via the sex chromosomes there are other factors inherited on the X chromosome, including certain hereditary diseases, and these are said to be sex-linked or more correctly X-linked.

(b) Incomplete Dominant

This is where the inheritance often appears due to a single dominant allele passed on from one parent, but sometimes not. This is usually due to incomplete knowledge of the precise mode of inheritance.

(c) Polygenic

This is where a number of different genes are involved in inheritance of a particular characteristic. The classic example is canine hip dysplasia.

Genetic Testing and DNA

One of the exciting scientific breakthroughs of more recent times is in the field of molecular biology, where tests have been developed to find the locus of specific genes and identification of their various alleles. For example, related to the above, there are tests for colour genotype in Labradors. This enables a breeder to determine the genetic status of a Labrador for colour and the expected colour ratio from a particular mating. In some instances it may be important enough for a breeder to pay for such genetic testing to know whether a black dog is a carrier of chocolate or yellow, or a yellow dog is a carrier of chocolate. Of far greater significance is the use of genetic testing in determining hereditary disease status.

Answer to the puzzle The phenotype ratio is :

9 black : 3 Chocolate : 3 yellow with black nose : 1 yellow with chocolate nose.

References:

1. The Inheritance of Coat Color in Dogs, by CC Little (Howell, 1976)
2. Genetics of the Dog, by MB Willis (Wetherby, 1989)
3. Practical Genetics for Dog Breeders, by MB Willis (Howell, 1992)
4. The Genetic Connection, A Guide to Health Problems in Purebred Dogs, by L Ackerman (AAHA press, 1999)

THE BROOD BITCH

All the best books and all the best breeders will tell you without any hesitation that the most valuable asset any kennel which is striving to breed winning stock can have is a good brood bitch.

This basic concept cannot be doubted. What makes a good brood bitch?

Basically all of the general things which the previous chapters of this booklet have touched upon. Namely, health, well adjusted in temperament, freedom from hereditary disease and of good quality. Mostly it will be the ability of the bitch to mate normally, conceive easily and deliver without undue fuss a healthy, good-sized litter and then, equally without fuss, raise the entire litter to weaning age.

For purposes of producing show dogs, even more is required. She will have a good pedigree. Not merely the three to four generation paper which is the normal attachment to all pure bred dogs, but one which perhaps hails a line of notable pillars of her particular breed. She should exhibit the special traits of the family concerned. She will have attained the standard height and expected weight set down *in* her breed standard and she will not depart from any breed requirement to any degree which could be considered of a serious nature.

Most of all, she will have the ability to pass on the desired features to her offspring and she will have the temperament to transmit to her brood, by example, that all is well with the world.

The temperament and disposition of the brood bitch is of paramount importance. Until the pups leave home they will learn from, and mimic, their mother — both good and bad! It is virtually impossible to breed mentally sound and stable puppies from a bitch with bad temperament.

Her puppies will, as a result, have the best possible start in life. They will be well formed, well fed, healthy and well adjusted.

The bitch that panics easily, is a fussy feeder, and has a history of ill health cannot do these things for her puppies, or for you, no matter how beautiful she may be. She is best avoided as a prospect for the whelping box. Avoid also the orphaned or hand reared female, unless you can be absolutely sure that the reasons for the artificial rearing were accidental and not familial degeneration of the ability to procreate normally and without help.

A future of misery is in store for the breeder who insists on veterinary intervention when his bitch is reluctant to breed normally. Such bitches will generally follow through into expensive caesarian deliveries, be reluctant mothers, leaving their overwrought owners to supplement or completely hand rear the puppies. Without natural sustenance it is rare for puppies to fulfil potential as 100% healthy adults. These litters almost always run their owners into financial loss and, worse, it is often the female puppies from such unfortunate ventures that perpetuate the family woes.

A truly good brood bitch is beyond price, but if it is your aim to become a noted breeder, no price is too much to pay for such a gem, if indeed one were to become available.

Since we have opted to be custodians of our breed, as breeders, it is our responsibility to the future gene pool to see that poor natural breeders are not perpetuated — no matter how good looking we perceive them to be. By simply not breeding from them is far less harsh than nature's means of culling.

In short, we aim to produce puppies which are sound both mentally and physically.

There is more to breeding dogs than producing pretty looking specimens. The brood bitch is the key to the immediate future because she has too much influence on her puppies beyond her contribution to their genetic makeup.

SELECTING A STUD DOG

In these days of technology and permissive Governmental regulations, to breed a pure litter in Australia today, the stud dog may be a pure pet quality animal which, in fact, resides in your own backyard, or he may be a multi-titled champion living in another country, being merely the donor of semen for artificial insemination. The avenues for selection, therefore, are myriad and, as such, can be quite daunting or perplexing for new breeders and experienced breeders alike. Particularly, if they are going to wade through the sea of paperwork involved in semen importation.

Whatever his quality, his pedigree or his breed, the stud dog should conform to some very basic criteria before he is used to pass along his genes to the next generations, just as the dam of the proposed litter should conform to the breed standard.

Firstly, the dog will need to be sexually mature, entire and sound of health, both physically and mentally. Ideally, he should be mature in growth and development.

The use of very young males prior to the manifestation of all adult traits can be a very costly error if he develops any serious temperament problems or departure from the breed standard with maturity. The same goes for hereditary diseases that, in some cases, are not totally obvious until the dog is well into middle or old age.

Although it is not practical to wait several years before using a dog at stud, by which time he could well have lost the desire to breed normally, it is an obligation of the breeder to take all reasonable steps to ensure that the stock he is working with is healthy in all ways.

The choice of stud dog should result from exhaustive talking to people within the breed. Stud dog owners may offer a 'rose tinted' opinion that their dog is suitable for every bitch — such a dog has still to be bred!

Seek opinions from the breeder of your bitch, from anyone who has already bred from siblings of your bitch, and from anyone else in the breed who can show success in their breeding programme. From all of this information attempt to distill the necessary pearls of wisdom that will point you in the direction of the most appropriate dog for your bitch.

You owe it to the future generations of dogs you intend to breed to check back on the parents of the dog and, probably even more importantly, the grandparents. Basically satisfy yourself that none of these close ancestors died at a young age or from any known serious hereditary defect. That is a good start. Longevity is a very good sign of health and vigour.

For the regular exhibitor, selecting the suitable stud for his bitch will be relatively simple. He will have all the facilities at hand to make his choice from other show or trial stock. These may be present at local shows/events, or he may discover them in another State. He has access to breed journals and kennel journals in which stud dog owners advertise the prowess of their males. Many show catalogues even give a contact point for exhibitors.

For those who do not show or trial their dogs, finding a suitable male is perhaps more difficult. As members of your State canine body, they will be in receipt of that State's magazine, which will list various males of their chosen breed, either in the stud directory or in litter registration lists. A telephone call to these advertising members will usually yield all the information necessary. If the advertised stud is not perhaps suitable in the opinion of the owner, no doubt he will be happy to recommend or advise a further direction. Otherwise, a telephone call to the State canine association may provide an appropriate contact or starting point.

If one is sincere in their endeavours to breed very good or superior stock, then there is no escaping the fact that the bitch must be appraised for her adherence to the breed standard and her faults isolated and recognised. Most importantly, the stud male chosen should on no account be the bearer of the same faults, but should be capable or, better still, proven to be able to overcome these faults in his progeny.

The above points are the basis for stud dog selection. The very word 'stud' implies that the animal concerned is superior or, at least, of very high quality. For that reason the dog should not really be offered at stud unless he can be held in this light.

CONCEPTION AND PREGNANCY

Having done your "homework" for a suitable breeding pair, the breeder must be entirely sure that the bitch is physically mature and of sufficient mental maturity to take on the task of whelping and raising a litter of puppies.

The onset of a normal breeding season becomes apparent to the observant bitch owner some days before actual physical signs appear. She can often show a marked change in personality by seeming more gregarious and outgoing. Some owners notice a slacking of muscle tone. The vulva will start to increase in size. She may urinate more frequently and in more than the usual places. Check your bitch daily at this time.

The first day to mark on the calendar is the first show of colour or bleeding from the vulva. Some bitches are extremely fastidious in personal hygiene and will clean any signs away. Letting her sleep on a white sheet or towel may overcome this problem. Now is the time to notify the owner of the chosen stud dog that the bitch has come into season and his services will be required in ten to fourteen day's time.

There will be a marked swelling of the vulva as the colour of the discharge deepens. This section of the season (heat) can last anything from a few days to two weeks and generally the bitch is not able to conceive during this phase. She will let you know by her anti social behaviour toward any male dog that she is not interested in any close attention at this time. It is not until the discharge changes to a straw or clear colour and the vulva begins to soften that the signals point to imminent acceptance of mating. The bitch will demonstrate by her now flirtatious behaviour toward any male dog, that the hormones within her are doing their work and the release of the eggs ready for fertilisation. This fertile period of the season can last from hours to many days. It is now that the chosen male can be introduced and successful mating can occur.

Warning - if you have a male dog living with your bitch and he is NOT the chosen stud dog, make sure there is no contact between these two for the duration of the season. If necessary, arrange to send your male dog to a boarding kennel for the full length of your bitch's season, to avoid any accidental matings.

It is normal practice to take the bitch to the stud dog's home for matings. Other arrangements can be made. It is best to let the dogs become acquainted and to play freely for their first introduction. The bitch may act coy, inviting advances one moment, rejecting them the next. This is all part of a normal breeding routine. Both animals need the play to stimulate sex drives and normal mating mechanisms into action. They are best left to their own devices, together for ten to fifteen minutes at least. Watch from a window, just to make sure that no harm comes to either animal.

Most bitch owners become over anxious when no immediate mating occurs. This is common. Usually they have introduced the dogs too early in the season and another meeting in the next day or so will result in a normal mating. The experienced stud dog owner can be of great value at this time.

Sometimes minor adjustments such as standing a too tall bitch downhill, or a too short bitch uphill are all that are required. Over restraint, unnecessary muzzling of the bitch and unnecessary interference can create problems for the maiden bitch. A natural, unaided mating should be allowed to occur where possible.

Competent stud dogs become adept at exerting their energies only when the female is actually releasing ova and able to conceive. He may as a result appear disinterested. These same males become suddenly proficient when all conditions are favourable. Young over enthusiastic males sometimes require gentle restraint and assistance from their handler to achieve a successful mating.

For this reason it is far wiser to take the maiden bitch to an experienced proven sire and accomplished stud master for her first breeding encounter.

One mating resulting in a normal tie should be sufficient for conception to occur. Most stud dog owners offer a second mating to cover any later release of ova, up to forty-eight hours after the first. After the acceptance phase of the season has passed, the vulva will shrink back to normal size and the discharge will stop.

During the fifth week of her pregnancy, the bitch should be treated for internal and external parasites. She should be fed a normal diet and exercised regularly. By various means available, it is now possible to detect the whelps (pups) at about 28 days. By six weeks the pregnancy should become easily observable and at this time it is advisable to commence feeding your bitch twice daily instead of once a day. The increased pressure of the pups against her stomach will make her uncomfortable with a large meal. Gentle exercise should be kept up until whelping to help maintain muscle tone.

FEEDING THE BITCH: PREGNANCY TO WEANING

How much and what to feed your dog changes throughout its life and is dependent on age, body condition, activity level, breed, temperament and environmental conditions. Each dog should be looked at on an individual basis, increasing or decreasing the amount fed depending upon their overall condition.

Prior to breeding, your bitch should be in excellent physical condition, and at her ideal body weight. Underweight bitches may become undernourished during pregnancy, which can result in smaller pups that have a reduced chance of survival. Obesity reduces the fitness of the bitch resulting in increased difficulties whelping the litter. Bitches should receive moderate exercise during their pregnancy.

What to feed....

Optimal nutrition is important during pregnancy for the health of your bitch, and of her pups. Pregnant and lactating bitches should be fed food that is of good quality, and is highly digestible. Whether feeding commercial foods or a raw, natural type diet, pregnant and nursing bitches should be fed "growth" (e.g. puppy formulations) or "high performance" foods. These diets have higher amounts of energy, protein, carbohydrates and minerals than are normally required for adult maintenance, providing adequate nutrition without having to increase food consumption. Increasing food supply of an inferior product may require more food to be digested than a bitch is physically capable of doing. A well balanced diet should supply all the nutrients the bitch requires, and supplementing food with calcium is not recommended.

It is normal for some bitches to have a short period of reduced appetite during early to mid pregnancy. Many may also reduce their food intake a day or two before whelping, or during the first stage of labour.

And when to feed

During the first half or about the first five weeks of pregnancy, although the developing litter is growing, they are still relatively small, being less than 30% of their size at full term. In a well-nourished dam, normally no increase in feeding or nutrition is required during this time.

From the end of the fifth week the developing foetuses start to increase rapidly in size. At this time, there is a great increase on the nutritional demands of the bitch, and it is necessary to increase her food intake. This should occur gradually. A rough guide is your bitch should be eating approximately 25-50% more than her normal maintenance requirements, by the term of her pregnancy. This varies depending upon the size of the litter, and of the bitch. Because the growing puppies expand into the available abdominal space, smaller, more frequent meals should be provided over the course of the day during these last few weeks. Always ensure fresh water is available.

A general rule of thumb is that after whelping her litter, a dam should weigh around 5 10% more than her normal body weight.

Whilst a bitch is nursing her young, it is important to maintain her on high quality, highly digestible food, and also to provide ample water. Even when nursing a small litter, bitches should be fed a premium food providing high nutrients ("growth" type diet). Insufficient fluid will reduce her ability to produce milk, as will inadequate calories. It is always essential that cool, clean water be available for your dogs. During lactation, this cannot be stressed enough, as the dam with a low fluid intake will have a reduced milk output.

As a rough guide, during the first week of lactation, your bitch will usually require about 1.5 times her routine food intake. This amount increases as the pups grow, to around 2.53 times her usual amount of food in the third to fourth weeks. Meals should continue to be divided into several small portions and fed over the course of the day, or offered ad libitum. Bitches nursing large litters may be fed as much as they wish to eat.

As solid/semi-solid food is introduced to the litter, the demands on the bitch will decrease and her food consumption can be reduced.

Pups can go to their new homes from 8 weeks of age, so weaning of the litter is usually completed between 7 — 8 weeks of age. Bitches who continue to produce much milk whilst the pups are weaning can have this reduced by decreasing her feed intake. Weaning should be undertaken gradually, so as to minimise risk of mastitis (inflammation of the mammary glands).

Summary

- Feed your pregnant and nursing bitch a food that is highly digestible and is high in nutrients (growth diet).
- No increase in food required until 5-6th week of pregnancy.
- From 5-6th week, increase food intake. By the end of pregnancy, bitches usually require between 25%-50% more than their normal intake of food.
- Provide several small meals per day during latter stage of pregnancy, and during lactation.
- During peak lactation time (weeks 3-4), bitches will require up to 3 times their routine food intake.
- As solid foods are introduced to litter, reduce dam's food intake.
- Always ensure clean, fresh water is available.

WHELPING THE LITTER

Provision of a whelping box

A whelping box does not have to be "a box", but should be a method of containment of the bitch and her forthcoming litter which provides a quiet, warm place, free from moisture and excessive heat or cold. Often layers of newspapers are used as a cheap, easy to clean base. Often internal rails are provided around the box to prevent the bitch from lying directly against the sides of the box so as to prevent her from pinning her pups against the side and suffocating or crushing them. Rather than a solid wooden box with internal railings, some breeders will use a child's inflatable pool (which has flexible sides) as a whelping containment. The size of the box will depend on the size of the bitch, but it must be long enough for the dam to be able to lie down at full stretch. Ideally the sides of the box should be high enough to prevent the young pups from escaping, yet enable the bitch to leave when she desires. The box should be disinfected before use. Bitches can be introduced to the box one to two weeks prior to whelping. Boxes should be lined with bedding material, or newspaper • that the bitch may shred as part of her nesting behaviour which occurs shortly before whelping.

Once the litter is whelped, the initial bedding material may be replaced with other bedding, such as sheepskin, or towels, as the bitch will be less likely to shred them. Newspaper can continue to be used as an insulent beneath the new bedding, as it is cheap and easy to dispose of, but something offering traction is required to provide developing puppies secure footing. Some breeders add external sources of heat to keep the newborn pups warm. A heat pad is placed into the whelping box but it should not cover the entire area so some relief from overheating is available. Heated whelping boxes are also available for hire or purchase. Hot water bottles, wrapped in towels, and refilled as they cool may also be used. In all instances, care must be taken to ensure the dam and pups are able to move away from the heat when required.

Whelping

For most dogs, the average length of gestation (pregnancy) is 64-66 days following a surge in leutenising hormone (LH) levels, or 62-64 days post ovulation. Ovulation is triggered by the LH surge, and ova are then released over the following 1-2 days. **The normal time frame between breeding and whelping can vary between 55 to 70 days**, depending upon the time when the bitch was mated. If a bitch was mated before she ovulated, she can still become pregnant, as spermatozoa can remain viable within the reproductive tract of a bitch for over a week. It is assumed however, that the sperm reduce in number or fertility within a few days of mating. When the eggs are released by a bitch, they are immature and require 2.5 to 3 days after ovulation to mature. Bitches bred after they have ovulated and the egg has matured will therefore conceive much earlier. Therefore, don't always assume your bitch will deliver pups exactly nine weeks after being mated.

Clues then whelping is imminent

Many bitches may display "nesting" behaviour in the few days, or week preceding birthing. They may collect papers, clothes etc together, may seek shelter beneath chairs or other furniture, or may dig a burrow. Some may become restless or "clingy". Production of milk is not a reliable sign that whelping is imminent, as many bitches may exude watery secretions up to two weeks prior to whelping.

Within 24 hours of whelping, levels of a hormone called progesterone decrease, with a concurrent drop in rectal temperature of 1 degree C. Twice daily (or three times, if possible) monitoring of temperatures, starting several days to a week before expected whelp date will normally detect this drop in temperature.

Whelping - First stage of labour

This is the initial phase of labour, where the cervix begins to dilate. Bitches may refuse food, appear restless, pant, shiver or occasionally vomit during this time. (So may novice breeders!) This stage can last a variable amount of time, from hours to more than a day. Weak contractions of the uterus may also occur.

Second stage of labour

The second stage of labour is when the cervix fully dilates, contractions will be easily seen, and finally, pups are born. When the pups pass through the cervix, this creates the urge to push and visible straining of the bitch can be observed. Bitches will often move around between whelps, but most will lie down as each pup is born. Bitches can be expected to pant and may lick their genitalia, or shiver, prior to the birth of a pup. The first pup to be born is usually from the side of the uterus (uterine horn) containing the most fetuses. The next pup is usually from the other horn, and so forth.

Prior to the birth of the first pup, a greenish-black discharge (lochia) may be observed. This is normal, and results from the placenta separating from the uterus. Whelping should occur within the next one to two hours. Whilst in the uterus, each pup is surrounded by two sacs. The outer one ruptures as the pup enters the birth canal, releasing a small amount of fluid. The second sac may, or may not, rupture during birth. If it hasn't ruptured, the dam who will also bite the umbilical cord will usually remove it. The bitch will also vigorously lick fluid from the pup, which stimulates it to breathe and assists in drying.

The bitch will normally suckle pups between whelping the following pups. Nursing stimulates release of the hormone called oxytocin, which in turn stimulates milk let down, and contraction of the uterus. The newborn puppy will also receive colostrum. This is specialised milk, which is rich in antibodies and produced within the first 24 hours of whelping. The antibodies are absorbed by the newborn pup, providing it with immunity to infectious agents.

Third stage of labour

This final stage is the passing of foetal membranes and placenta, and often occurs as subsequent pups are being whelped. The time between second and third stages is extremely variable. Some bitches may deliver puppies 5-10 minutes apart, others 20-60 minutes apart. The time intervals between pups usually increase as labour continues. As the whelps are often delivered alternately from each of the two uterine horns, two pups are often born close together. When this happens, the placenta from the first pup may not be passed until the second pup has been born.

Opinions vary as to whether bitches should be allowed to eat all the placentas. The placenta is rich in nutrients, so there is no medical reason to prevent this from occurring but ingestion can result in dark, loose stools and/or vomiting.

The time it takes for a bitch to normally whelp her litter will depend on the breed, her fitness and age, number of pups in the litter, etc. Once the bitch assumes strong straining, a pup should be whelped within 30 minutes. As labour progresses, normally the time between delivery of pups increases. If the bitch has strong contractions and strains for an hour without producing another pup, veterinary assistance should be sought. If the bitch has weak contractions, the interval between puppies will be longer. Veterinary assistance should be sought for bitches with weak or intermittent contractions who do not produce their first pup within four hours after the start of stage 2, or within two hours between later pups*. Some bitches may rest after delivering the majority of the litter, to resume some hours later. It can therefore be difficult to distinguish between genuine rest, and uterine inertia.

* Times quoted from: Johnston, S.D., Root Kustritz, M.V. and Olson, P.N.S. *Canine and feline theriogenology*. Philadelphia: W.B. Saunders, 2001. These times may vary in different books. You should discuss with your veterinarian at what time they feel assistance should be sought. It would also be prudent to have either your veterinarian's after hours contact details, or the phone number of the after hours clinic to which they would refer you, should assistance be required.

Post partum

Following completion of birthing, the dam will require rest. She may also be hungry and thirsty. She and her pups should be taken to your vet within the next 12-24 hours for a thorough check. Your vet will check the pups for obvious signs of congenital defects, such as cleft palate.

In the first few days after delivering the litter, there will be a red, watery vaginal discharge from the bitch as the uterus starts to reduce in size. During the following weeks this amount decreases and becomes brownish-red. Discharge occurs for about 3 weeks.

The bitch's mammary glands should be regularly checked for signs of inflammation, or mastitis. They may become reddened feel warm and lumpy, and when gently expressed,

the milk may have an abnormal colour. If you are at all concerned, seek veterinary advice.

Summary

- Bitches whelp between 55-70 days after mating, or 62-64 days after ovulation.
- The whelping area should provide a safe, warm, dry environment.
- A drop in rectal temperature of 1 degree C occurs within 24 hours of whelping. Within 1-2 hours of whelping, a small amount of greenish black discharge (lochia) may also be seen passing from vulva.
- Pups should be born within 30 minutes of strong straining. For the first born, a pup should be produced within 4 hours of weak or intermittent contractions. Subsequent puppies should be whelped within 2 hours of weak contractions. Seek veterinary assistance should times fall outside these parameters.

WEANING, SELECTION AND SALE OF PUPPIES

Your bitch will require large amounts of food while feeding her puppies. After she has settled to the task of looking after her new brood of puppies, allow her to eat as much food as she wants. Because of the large amounts of food she will require to produce adequate milk, she should be fed several meals daily. Make sure she has constant access to fresh water.

Puppies drain huge amounts of protein from the bitch, so if she is to continue to nurse her offspring for some weeks, she will need plenty of good quality food for adequate nutrition and for producing milk.

Between three and four weeks of age the puppies' teeth will begin to emerge, this is when solid food can be introduced. A good balanced diet should be commenced at this time. Feed puppies separately so that you know that each one is getting its share.

Soft, moist foods can be introduced as soon as the puppies are able to stand. These foods are usually a milk/cereal mixture or puppy pellets thoroughly soaked in warm water. Again try to do this one at a time, or you may find that they all start walking through the bowl and getting into a right mess. The bitch will now be able to cope with any extra feeding that the pups require without putting too much strain on her own condition.

By six to seven weeks of age, depending on the breed of dog, the puppies should be having five small meals a day.

Worming: nearly all puppies have roundworms because the eggs are passed from the mother before birth through the placenta and after birth through the milk. Worming of the puppies should commence as soon as they are strong, average age two to three weeks. Worm the bitch at the same time. Read the advice given on worming preparation carefully and follow the instructions.

Puppy playpens are ideal, with plenty of soft, safe toys for them to play with. This builds up their muscles and gives them coordination skills as well as developing social skills. Having a radio or TV (not too loud) in the room allows the pups to hear a variety of noises and sounds to enhance their ability to cope with the sounds of their prospective new homes. Breeders should keep a close observation during playtime to watch for differences between the pups. Some may be assertive and some submissive. Knowing your puppies' personalities will help in matching up the right homes for them. You would not offer a submissive pup to a family with boisterous children.

The veterinarian should give your puppies' first vaccinations at about six weeks of age. This is also a good chance for the vet to examine the puppies for any problems. Make sure you collect a vaccination certificate from the vet for each pup, as you will need to pass this onto the new owners so they can follow through with the next vaccination due at about 10 - 12 weeks.

Depending on the breed, it is usual for puppies to be transferred to their new homes around eight weeks of age. This is the optimum age for the puppy to best adapt to the world outside its playpen and away from its siblings. If the new home has an existing dog, there are certain precautions to take. Jealousy is very common from the resident dog/s. Suggested advice: ask the new owners to have a family member take the existing dog to a local park or neutral territory. Have member/s of the family take the new pup to the same park - on a lead or harness. Have one family member play with the new pup on the ground and let the existing family dog come along and 'find' this new 'friend'. Allow the two dogs to play a little and then walk them both home together. This way, the existing family pet will think he or she has found a new playmate and the family is allowing this playmate to come home with him/her. If you just place a new pup in the backyard with your existing family pet, jealousy and protection of its territory, may have a devastating effect.

Make sure your new puppy owners have secure fencing, or at least an escape proof (digging and climbing, wise) enclosure. Insist that suitable housing is available for the new family member with plenty of warm bedding. This will be the first time the pup is away from its siblings and it will feel very much alone. Responsible dog ownership begins with you - by example and by instruction.

There are a number of items you should provide the new owner when they pick up their pup.

- Vaccination certificate
- Worming chart
- Diet sheet
- Special care instructions - grooming, training etc.
- Registration papers - duly signed by you on the reverse side
- Any conditions of sale
- Copies of sire and dam's health checks
- Possibly a breed hand book
- Receipt for purchase price of pup
- Sample pack of food that the pup as been fed

Inform the new owners of any common hereditary problems in your breed and alert them to each party's obligations concerning future health. Let them know you will be interested in the pup's progress into adulthood and beyond. This is offering good 'after sale service'. It also enables you to keep good breeding records of your offspring and the future development of your chosen breed.

PUPPY SOCIALISATION

One of the most interesting and rewarding programs that have been developed over the years is the Puppy Socialisation Program introduced by Obedience and Kennel Clubs alike.

These programs were introduced to help us understand the basic fundamentals and complexity of our canine companions. When introducing a new puppy into your home it is important that you understand the reason he does those annoying things and more importantly the manner and approach you adopt in the correction process.

The interaction between puppies in these classes gives them opportunity to relax and socialise when they come into contact with dogs of different breeds, colours and temperaments. The interaction will enable them to adapt to the new world outside of the whelping box, where those little annoying traits and problems have been allowed to develop.

Puppy Socialisation Programs should cover all those things that a pup needs to know, from going for a visit to the veterinarian to being groomed to introducing of a new baby member of the family. These occasions are meant to be in a relaxed and enjoyable atmosphere. Remember the effort that you put in at the beginning will give you continued pleasure *in* the future.

When you take your new puppy home, you cannot expect that the family life you introduce him to will cover all those unexpected problems that will occur during his life. The manner with which you deal with particular incidents when they arise will be the basis of how your puppy will fit into society and your family.

The social interaction of these programs will also prepare the puppy for the more serious training that will come later.

Training

Obedience training is the basis upon which all canine activities are based, be it for conformation, tracking, endurance or agility, and it is also used in the services.

Obedience clubs have qualified instructors who have trained for many years and may have even competed in trials for a number of years. These instructors have completed an evaluation program set out by their controlling body and have gained recognition as qualified obedience instructors. These instructors then pass on their knowledge to other instructors of the club and those wishing to aspire to that level.

The training of your dog should commence after your pups socialisation program or from approximately six months of age. The training program with most clubs will cover the areas from the basics, up to and including competition level. The clubs conducting these classes work with a set program, which progresses you and your dog up the training ladder. You may even like to go just for the socialisation benefits to your dog.

Most of the programs start with basic on lead heeling exercises and associated exercises such as standing, sitting and examination. This will be followed by more advanced heeling including heeling off the lead and with the dog sitting free of the lead at varying distances. The examination exercise will cover the areas as per conformation (required if you wish to show your dog) and obedience-the purpose of the exercise is for the dog to show no undue resentment or shyness whilst being examined.

Dog aggression should not be tolerated under any circumstances and if present should be evaluated by the senior instructor of the club or by an appropriately accredited person.

As you continue through the various classes it will become one of the most satisfying and rewarding experience you have embarked upon. To see that once unruly and disobedient dog develop into a companion with whom you can walk down the street and have the public express and make comment on their behaviour is truly rewarding and on many occasions encourages others to take up dog obedience training

Many of the local councils have obedience clubs in their area and in the first instance you should make contact with them, alternatively you should contact your states canine control council for further information on clubs in your area.

RESPONSIBILITIES OF THE BREEDER

Be aware that there are serious considerations, which bear thinking about beyond the natural mechanics of reproduction.

They are the moral and practical obligations —

- to yourself and family;
- to your dogs;
- to your neighbors;
- to the eventual recipients of your excess stock.

You owe it to yourself and those around you to be fully conversant with the amount of time the properly raised litter of pups will require. Puppies need to be fed little and often during the first three months of life. The dam of your litter will require close observation as her whelping time draws near to be sure that all is going normally and after whelping to see that she is carrying out her maternal duties normally. The new puppies will require close observation on a constant basis to ensure that none are accidentally crushed by their dam, or able to move away from her and lose body heat. The first ten days are crucial for the survival of a normal litter.

From three to four weeks the weaning of the pups will require attention at minimum intervals of three hourly, and as they become less dependent on their dam they become more dependent on their breeder for food, cleanliness and warmth or cooling, whichever is appropriate.

It is therefore not satisfactory to take on the venture of breeding dogs unless full time care of the animals will be available. If you cannot be spared from other commitments to tend the litter and you cannot have on hand a responsible person who can do so, it is better to wait until the time will be available.

Constant supervision will ensure that there is no reason for a litter of puppies to become noisy or create other nuisance to the surroundings.

As the puppies grow and the excess are offered for sale you will need to be available to show your puppies with pride, in clean, sweet smelling surroundings and to answer queries from would be purchasers. To do this you will need to make yourself conversant with proper care requirements for your particular breed, or have access to someone who can answer any questions you are unable to answer. It is simply not enough to call an end to responsibilities with the departure of the puppy with its new owner.

You must be timely and meticulous with paper work. Litter registration should be lodged with your canine controlling body, along with fees, as soon as practicable after the birth of the puppies. Don't forget each pup must have a name. Eligibility for registration lapses after 18 months.

No puppy should leave your establishment without its new owner being handed a duly completed registration form, full instructions on the rearing and care of the puppy, certificate of vaccination and further information in the event that one day this puppy may be bred from. For instance, the necessity to register a stud prefix well before mating takes place and the need to be well acquainted with information on responsible breeding practices.

Will you be in the position to replace the puppy or to refund the purchase price if the dog develops a serious hereditary defect in the first year of life? Are you prepared to educate yourself sufficiently to be aware and conversant with major research on any such defects which afflict your chosen breed?

Facilities

Cost factors

Time and labour

Veterinary attention

After sale availability

Think again on all of the above subjects. Assess your own position to attend to them. Only if you are absolutely certain that you can provide all the required finance, time and obligatory services should you embark on the journey to breeding pure bred dogs.

If you are certain that you have what it takes to be a responsible dog owner and breeder of the future, then enjoy your pastime.

RECOMMENDED READING

"Book of the Bitch" J. M. Evans and Kay White, 1995
Published by Ringpress Books ISBN 1860540236

"The Dog Owner's Manual on Selecting, Raising and Breeding Dogs" Karen Hedberg,
1989
Published by Watermark Press ISBN 0949284149

"Birth of Puppies" Andreas and Heiderose Fischer-Nagel, 1984
Published by JM Dent & Sons Ltd ISBN 0460061666

"Everydog : The Complete Book of Dog Care" Rowan Blogg and Eric Allan, 1983
Published by Methuen Australia ISBN 019531728

"Dog Breeding" Kay White, 1980
Published by Bartholomew & Sons ISBN 0702810592

"The Breeding and Rearing of Dogs" R.H. Smythe, 1979
Published by Popular Dogs ISBN 0090982207

"Dog Genetics: How to Breed Better Dogs" Carmelo L. Battaglia, 1978
Published by TFH Publications ISBN 0876666624

"Breeding, Whelping and Natal Care of Dogs" Louis L. Vine, 1977
Published by Arco ISBN 0668041609

"The Complete Herbal Book for the Dog" Juliette De Bairacli Levy, 1975
Published by Faber & Faber ISBN 0571048595

"Dogs and How to Breed Them" Hilary Harmer, 1974 revised (the Bible on dog
breeding) Published by John Gifford ISBN 0707100100

"How Puppies are born" Virginia Bender Prine 1972
Published by Howell Book House ISBN 0876055536

"Dog Behavior — Why Do Dogs Do What They Do?" Dr Ian Dunbar
Published by T.F.H Publications Inc. ISBN 0-87666-671-3

"Do Dogs Need Shrinks" Peter Neville 1992
Published by Citadel Pr. ISBN 0806513322

