Selection and Use of Commercially Available Rodent Chow Products

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Introduction

A critical choice and challenge facing wildlife rehabilitators of small rodents (i.e., tree, ground and flying squirrels, chipmunks, rats and mice) is the selection of a suitable diet for weaning and post-weaned animals. To meet this need, many rehabilitators have turned to one or more of the commercially available rodent chow products. Other rehabilitators have elected not to use these products.

This article discusses some of the reasons that rehabilitators have indicated they are attracted to use these products, and why some have avoided them. For those rehabilitators that have chosen to use rodent chow, this article gives an overview of 27 different rodent chow products available from five different manufacturers, including their recommended applications, composition and ingredients. Additionally, it also discusses certain criteria that can be helpful in selecting which product or products to use in certain situations.

Some of the more common reasons to use or not use rodent chow

The first decision facing a wildlife rehabilitator that rehabilitates the small rodent species groups listed above is whether to use rodent chow, or some other weaning and post-weaned diet, or some combination of both. The following presents some of the most commonly heard reasons that rehabilitators use rodent chow or why they do not:

Reasons rodent chow products are used

- Many rehabilitators want a reliable and consistent product that provides the proper nutrition to the animal. Some of the higher quality commercially available rodent chow products have been specifically formulated and manufactured for long-term research applications where a complete and balanced nutrition regime must be maintained under very stringent and controlled conditions.

- Using a purchased product precludes the challenges and uncertainties of trying to create a fully balanced and nutritious diet from other food sources. It also results in much less time and effort in attempting to acquire and prepare a fully “natural” or “wild” diet.

- Being a dry product, rodent chows are easily transported and stored. They come ready to feed, so no daily preparation is required. They are also relatively easy to administer and provide to animals in a controlled manner, monitoring how much food is provided and consumed in a given time interval. It is also easy to grind and include with formula for weaning juveniles, or soften for use with adult animals with mouth or teeth injuries.

- Being a relatively hard and solid product, it provides a gnawing source for a rodent’s continuously growing incisors.

- The more commonly used products manufactured by the larger companies are generally readily available in most areas, generally through local feed stores or by mail.

- The standard products are usually priced in the $.40-$1.50 per pound range when purchased already packaged in quantities of 20-50 pounds, making them a very cost-effective source of food.

- Some rehabilitators use a rodent chow product simply because they were told or instructed to use it by the individual who helped train them to become a rehabilitator. As such, they may have never really thought about why they use it or why they use a particular product over another.

Reasons rodent chows are avoided

- Some rehabilitators have expressed concerns about the quality of some of the ingredients used in the manufacture of certain rodent chow products (e.g., low-grade agricultural by-products, animal products, certain ingredients not generally considered to be healthy for rodent consumption).

- Similarly, some have expressed concern that a commercially prepared product designed for captive animals (i.e., laboratory or domestic) may not be appropriate for a wild animal. Additionally, being a commercial product, rodent chow is not a food the animal will encounter upon release to the wild.

- Some rehabilitators have reported that their rehabilitation animals have been very slow to accept rodent chow – if at all.

- Most rodent chows that have been used in rehabilitation applications have not been designed nor intended by the manufacturer for use with wild animals.

- Certain very specific rodent chow products may not be readily available in all areas.

While there are probably other factors that may impact a decision, these reasons tend to be the ones more commonly shared by rehabilitators in conversations discussing weaning and post-weaned diets.

Types of rodent chow products

Once the decision has been made to use a rodent chow product, it is helpful to understand the different types of products that are available and their intended uses. Many of the larger product lines (e.g., LabDiet, Harlan-Teklad, Mazuri) are formulated for and targeted for two primary purposes - breeders of rodents for a variety of purposes and research institutions conducting studies involving laboratory rodents. Accordingly, their products generally fall into one of the following three categories:

- High performance breeding and reproduction – these products tend to be higher in energy content, containing relatively higher percentages of fat.

- Growth or full cycle diets – these products are generally more balanced, intended for normal growth rates and the ability to use the rodent chow in a wider range of applications.

- Maintenance – these products tend to be leaner with a higher ratio of protein to fat, designed for longer-term captive environments, such as laboratory applications.

Many of these products are also available in an autoclavable formulation if microorganism content is an issue (i.e., some are even irradiated, available in a vacuum sealed package). Some products are certified as to not exceeding specified levels of microorganisms and other contaminants (heavy metals, pesticides).

Some of the smaller manufacturers (e.g., Oxbow, Kaytee) target their rodent chow products more for domestic rodents (hamsters, mice, and rats).

Although not a rodent chow nor a product designed or formulated to provide a balanced nutritional diet for rodents, the Primate Diet from Zupreem is included in this article as it is popular among some rehabilitators.

Table A presents the primary ingredients in each of the 27 rodent chow products studied as indicated in the guaranteed analysis. The table does not itemize the many supplemental vitamins or other trace nutrients that are included in each product.

Matching the nutritional composition to the natural diet

While several excellent references provide a description of the types of food small rodents in the wild prefer and actively forage, many of these natural foods are seasonal in nature, prompting a wide variety of food sources during the year. As a result, definitive research is still needed that describes the average or optimal nutritional composition of diets for rodents in the wild. As a default, the nutritional composition of some of the full-cycle, balanced rodent chows can be used as a proxy to estimate the proper balance of protein, fat, fiber, ash and energy content for a wild animal in rehabilitation. While not perfect or exact, many of these rodent chows have produced very satisfactory dietary results for small rodents in a captive setting for decades.

Table B presents a comparison of the 27 rodent chow products studied, with the data presented drawn from the guaranteed analysis and typical nutritional analysis for each respective product. The table also indicates the intended use of the product as suggested by the manufacturer.

Selection considerations

So if there are many commercially available rodent chow products from which to choose, what are some of the key factors that should be considered? While not a comprehensive list, the following criteria can be used to assess the suitability of one product versus another:

- Consider the animal's stage of development. As discussed earlier, the manufacturer generally recommends the application for which each product is to be used. As such, animals that are in longer-term recovery care or are being "wintered-over" may not be best matched to a high fat rodent chow formulated for breeding colonies. Weaning juvenile animals will likely benefit most from a product that is formulated for growth or full-cycle use, rather than one designed for long-term maintenance.

- Consider the ratio of protein to fat. If the manufacturer's recommendation usage is unclear, a quick way to assess suitability is to calculate the ratio of protein to fat as indicated in the guaranteed analysis, or, if available, the typical nutritional analysis. This ratio is easily calculated by taking the percent of protein divided by the percent of fat. For example, if the analysis indicates 20% protein and 5% fat, the ratio is 4:1. Table C shows the calculated ratio for the 28 rodent chow products, plotted on a continuum from a low ratio (i.e., higher fat on the top of the page) to a high ratio (i.e., less fat on the bottom of the page).

- Consider the ingredients and source of nutrients. A quick review of Table A shows which products are totally free from any animal products. For example, while all of the rodent chows have

fats, some are sourced from animal ingredients and some are sourced from vegetable ingredients. It also shows which have protein derived from only fish meal, or from fish and meat meal. Also shown are which products have flavorings added (e.g., Oxbow).

- Consider the intended application for the product. All of the rodent chows discussed in this article have been specifically formulated for use with rodents. The Zupreem Primate Diet, according to the manufacturer, is not designed for use with rodents.

- Cost and availability. Cost is generally not an issue, unless shipping to a very remote area is required. Availability may be an issue, but with appropriate lead-time, a local distributor (i.e. an animal feed store) can often order a specific product. Most of these dealers may also be able to order the more commonly used products fairly quickly. The websites of the larger manufacturers have a user-entered search feature that, when provided with a zipcode and mileage radius, will then list the distributors in the local area.

- Palatability. All of these products listed are eaten by either laboratory or domestic small rodents, thus are assumed palatable to rodents in rehabilitation, especially animals that have come into rehabilitation as pre-weaned juveniles. Adult animals may take longer to begin consumption. Some rehabilitators have had difficulty with this, and have switched to Zupreem's Primate Diet, as some rodents tend to eat it more readily. This is not surprising, as the fourth most prominent ingredient is sugar, and sixth is animal fat. Other rehabilitators have reported that rodents will not eat the rodent chow, especially when a generous array of "treats" are offered concurrently, such as fruits, hardwood nuts, and seeds.

- Specific requirements, such as autoclaving prior to use. Some of the products are available in autoclavable form if specific measures of sterilization need to be taken. It should be noted that these products have been manufactured assuming that autoclaving will occur prior to use, such as providing a coating of the chow to accommodate swelling and softening, and the raw composition of the product has been designed to compensate for any nutritional loss that may occur when autoclaved.

Tips to get rodents to eat rodent chow products

During the weaning process, gradually add very finely rodent chow dust particles to the formula. This provides extra nutrients to a growing animal and acclimates them to the taste, generally resulting in an easier weaning process.

Use a high quality rodent chow product, with minimal preservatives and animal fats which may become rancid if stored too long. Preferably use the rodent chow within six months or less from the manufacture date.

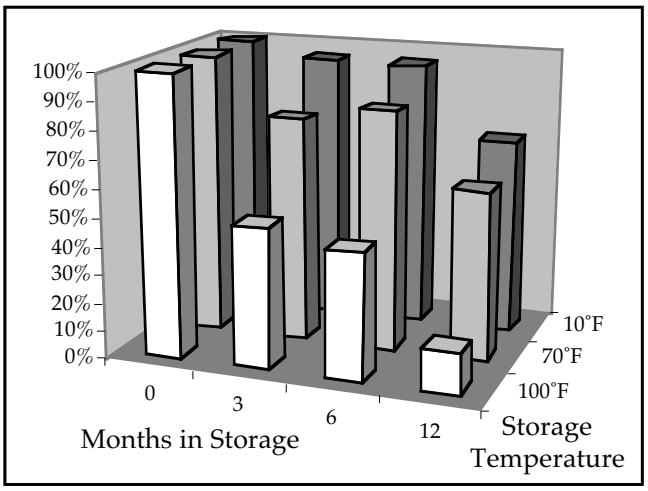
Avoid providing other supplemental foods until the rodent chow is fully consumed (then add native foods that they would find and eat in the wild).

If the wild juvenile rodent or injured adult does not immediately eat the rodent chow, consider rubbing the rodent chow with a fresh blueberry or wedge of apple to slightly sweeten the taste.

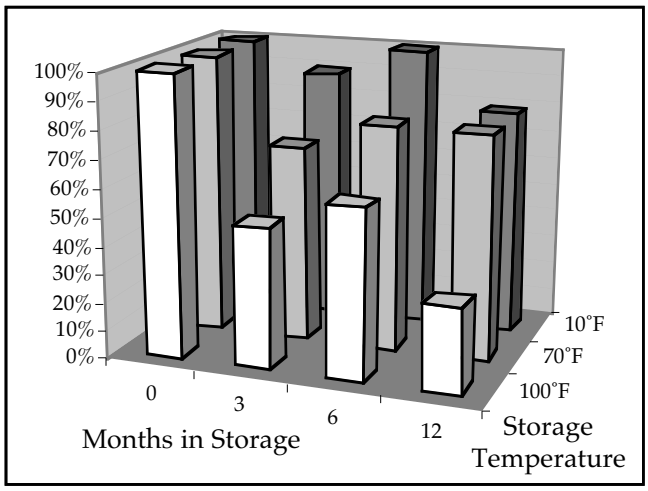
Storage considerations

As a dry product, most rodent chow products have a generous shelf life, usually from 6 to 12 months. Some of the manufacturers indicate that storage of the product at higher temperatures (>70˚F) will tend to cause vitamin loss. For example, the two charts shown in Table D indicate the effect of storage temperature and time on LabDiet's Certified Rodent Diet 5002 product. The manufacturer of this product recommends storage at temperatures of 72˚F or below, and not beyond six months. Some rehabilitators have expressed concerns regarding the optimum shelf life of those

Table D - Effect of Storage Time and Temperature on the Vitamin Levels of LabDiet Certified Rodent Diet 5002. (Source - the manufacturer's website.)



Percent of Vitamin A remaining



Percent of Thiamin remaining

The data from the two charts above are from the manufacturer, who indicates that storage at temperatures at or exceeding 100°F (38°C) is never recommended, and the data points shown are for comparison purposes only. The information does suggest that storage of the product at higher temperatures will accelerate vitamin loss. The manufacturer recommends storage of this product at temperatures at or below 72°F (21°C) and for not more than six months.

rodent chows containing high amounts of animal fats, with the potential to more quickly spoil, loose vitamin potency or become rancid and less palatable.

Conclusion

The selection of a suitable weaning and post-weaned diet for rodents in rehabilitation is just as critical as the proper selection of a milk-replacer for pre-weaned animals. For juvenile and young adult animals, critical development is still occurring as the animal grows. For incoming injured adults, correct nutrition is critical for steady and complete recovery.

With the availability of many suitable rodent chow products from several manufacturers, the rehabilitator is not forced to "guess at" or conjure up a diet that may or may not produce satisfactory results. Products such as LabDiet's 5001 and Certified 5002 rodent chows are cited numerous times as the standard products used for long-term critical research studies in a very controlled laboratory setting. These products have also proven successful in a wildlife rehabilitation by numerous rehabilitators. There are an array of rodent chows that can be used to provide differing levels of proteins and fats, and provide ingredients that are free from certain ingredients, microorganisms and contaminants.

The notion that rodent chow products are not palatable or preferred by rehabilitation rodents seems to be more an issue of husbandry practice. The rodent chow should be as fresh as possible and of the highest quality. Additionally, given a steady choice of "treats" containing higher levels of sugar and fat, some rodents will naturally avoid the rodent chow (just as some humans prefer a burger, fries and a shake over a green salad and a cup of lentil soup). With proper husbandry, cutting out the unnecessary "treats" and selecting a rodent chow that is properly formulated for rodents, rehabilitation animals will eventually begin to eat rodent chow – and show better results of steady weight gain, fullness of coat/fur, and overall satisfactory growth, development and health.

Table A - Primary Ingredients in Commercial Rodent Chows

LabDiet (www.labdiet.com)	
Laboratory Rodent Diet 5001	Corn, soybean meal, beet pulp, fish meal, oats, brewers yeast, molasses, alfalfa meal, whey, wheat germ, porcine meat meal, wheat middlings, animal fat preserved with BHA, salt
Certified Rodent Diet 5002	Corn, soybean meal, wheat, fish meal, wheat middlings, brewers yeast, molasses, wheat germ, beet pulp, alfalfa meal, oats, whey, soybean oil, ground soybean hulls, calcium carbonate, salt
PicoLab Rodent Diet 5053	Corn, soybean meal, wheat middlings, wheat, fish meal, beet pulp, molasses, brewers yeast, oats, alfalfa, whey, soybean oil, calcium carbonate, salt
Certified PicoLab Rodent 5K75	Corn, soybean meal, wheat middlings, wheat, fish meal, molasses, wheat germ, beet pulp, brewers yeast, alfalfa meal, oats, whey, soybean oil, calcium carbonate, salt
Formulab Diet 5008	Corn, soybean meal, wheat, fish meal, wheat middlings, animal fat preserved with BHA, molasses, oats, brewers yeast, wheat germ, meat meal, beet pulp, alfalfa, calcium carbonate, whey, salt
Lab. Autoclav. Rodent Diet 5010	Corn, soybean meal, wheat middlings, fish meal, wheat, wheat germ, brewers yeast, oats, alfalfa, calcium carbonate, animal fat preserved with BHA, beet pulp, soybean oil, salt
Autoclav. Rodent Breeder Diet 5013	Corn, wheat middlings, soybean meal, wheat, fish meal, alfalfa, animal fat preserved with BHA, calcium carbonate, brewers yeast, corn gluten meal, salt
EU Rodent Diet 14% 5LF2	Corn, wheat, soybean meal, wheat middlings, beet pulp, brewers yeast, alfalfa, calcium carbonate, salt
EU Rodent Diet 22% 5LF5	Soybean meal, wheat, corn, wheat middlings, beet pulp, alfalfa, brewers yeast, soybean oil, calcium carbonate, dicalcium phosphate, salt
Prolab RMH 3000	Wheat, soybean meal, wheat middlings, corn, fish meal, animal fat preserved with BHA, alfalfa, calcium carbonate, brewers yeast, soybean oil, salt
Prolab RMH 1000	Wheat, wheat middlings, corn, meat meal, soybean meal, animal fat preserved with BHA, alfalfa, dicalcium phosphate, brewers yeast, salt
Prolab RMH 2500	Soybean meal, corn, wheat middlings, molasses, oats, alfalfa, fish meal, animal fat preserved with BHA, beet pulp, calcium carbonate, meat meal, wheat, salt, wheat germ, whey, soybean hulls
Certified Rodent Opti-Diet 5136	Corn, wheat, soybean meal, wheat middlings, beet pulp, alfalfa, fish meal, whey, brewers yeast, calcium carbonate, soybean oil, salt
Harlan-Teklad (www.teklad.com)	
2014 Global 14% Protein Rodent Maint.	Wheat middlings, wheat, corn, corn gluten meal, calcium carbonate, soybean oil, dicalcium phosphate, salt
2016 Global 16% Protein Rodent Diet	Wheat, corn, wheat middlings, corn gluten meal, calcium carbonate, soybean oil, brewers yeast, dicalcium phosphate, salt

Source: Information about each product was obtained from the manufacturer's website on 5-15-2003. Does not include other added nutrients and vitamins.

Table A - Primary Ingredients in Commercial Rodent Chows

Harlan-Teklad (www.teklad.com)	
2018 Global 18% Protein Rodent Diet	Wheat, corn, wheat middlings, soybean meal, corn gluten meal, soybean oil, calcium carbonate, brewers yeast, dicalcium phosphate, salt
8604 Rodent Diet	Soybean meal, corn flakes, wheat middlings, corn, fish meal, molasses, whey, soybean oil, brewers yeast, dicalcium phosphate, calcium carbonate, liver meal, salt
8640 22/5 Rodent Diet	Soybean meal, corn, wheat middlings, corn flakes, fish meal, molasses, soybean oil, whey, dicalcium phosphate, brewers yeast, calcium carbonate, salt
8760 9F Sterilizable Rodent Diet	Wheat middlings, soybean oil, corn flakes, corn, fish meal, whey, animal fat preserved with BHA, soybean oil, brewers yeast, dicalcium phosphate, calcium carbonate, salt
Mazuri (www.mazuri.com)	
Rodent Pellets 5663	Soybean meal, corn, wheat, wheat middlings, animal fat preserved with BHA, molasses, fish meal, oats, porcine meat meal, alfalfa, beet pulp, wheat germ, brewers yeast, calcium carbonate, whey, salt
Rodent Breeder 6F	Corn, soybean meal, molasses, animal fat preserved with BHA, wheat middlings, oats, alfalfa, wheat, soybean hulls, dicalcium phosphate, fish meal, beet pulp, brewers yeast, wheat germ, whey, salt, corn gluten meal, calcium carbonate
Rodent Breeder 9F	Corn, soybean meal, animal fat preserved with BHA, molasses, wheat middlings, oats, alfalfa, wheat, soybean hulls, fish meal, dicalcium phosphate, beet pulp, brewers yeast, wheat germ, whey, salt, corn gluten meal, calcium carbonate
Rodent Breeder 11F	Corn, animal fat preserved with BHA, soybean meal, whey, molasses, oats, wheat middlings, alfalfa, wheat, soybean hulls, fish meal, beet pulp, dicalcium phosphate, brewers yeast, wheat germ, salt, corn gluten meal, calcium carbonate
Oxbow (www.oxbowhay.com)	
Rodent Maintenance	Brown rice, oat groats, wheat bran, distillers grains, soybean hulls, alfalfa, fax seed meal, fish meal, calcium carbonate, wheat germ, brewers yeast, salt (also includes rosemary and peanut butter flavorings)
Rodent Performance	Oat groats, brown rice, wheat, soybean meal, linseed meal, fish meal, distiller grains, calcium carbonate, brewers yeast, salt (also includes rosemary and apple flavorings)
Kaytee (www.kaytee.com)	
Forti-Diet Mouse & Rat	Corn, soybean meal, wheat, oats, peanuts, alfalfa, corn gluten meal, molasses, lignin sulfonate, fish meal, corn sugar, calcium carbonate, salt, dicalcium phosphate, animal fat (w/ BHA), brewers yeast, beet pulp
Supreme Mouse/Rat Daily Blend	Corn, oat groats, barley, soybean meal, wheat middlings, wheat, alfalfa, meat meal, sunflower, peanuts, corn gluten meal, molasses, animal fat, poultry meal, fish meal, salt, beet pulp, calcium carbonate, yeast
Zupreem (www.zupreem.com)	
Primate Diet	Corn, soybean meal, wheat, sucrose, wheat germ. animal fat preserved with BHA, propyl gallate and citric acid, dried whole egg, dicalcium phosphate, calcium carbonate, salt, vegetable oil

Source: Information about each product was obtained from the manufacturer's website on 5-15-2003. Does not include other added nutrients and vitamins.

Table B - Analysis and Comparison of Commercially Available Rodent Chow Products

	Protein > %	Fat > %	Fiber < %	Ash < %	kcals /gm	Ca:P ratio	
LabDiets (www.labdiets.com)							
Laboratory Rodent Diet 5001	23.0	4.5	6.0	8.0	3.04	1.42	Full life-cycle (not for breeding)
Certified Rodent Diet 5002	20.0	4.5	5.5	7.0	3.10	1.33	Full life-cycle (including breeding)
PicoLab Rodent Diet 5053	20.0	4.5	6.0	7.0	3.08	1.29	Breeding
Certified PicoLab Rodent 5K75	20.0	4.5	6.0	7.0	3.10	1.40	Full life-cycle (including breeding)
Formulab Diet 5008	23.0	6.5	4.0	8.0	3.31	1.54	Full life-cycle (including breeding)
Lab. Autoclavable Rodent Diet 5010	23.0	4.5	6.0	8.0	3.17	1.49	Full life-cycle (not for breeding)
Autoclavable Rodent Breeder Diet 5013	20.5	5.0	6.0	8.0	3.17	1.33	Full life-cycle (including breeding)
EU Rodent Diet 14% 5LF2	14.0	2.5	6.0	6.0	3.18	1.41	Long term maintenance
EU Rodent Diet 22% 5LF5	22.0	3.5	6.0	6.0	3.17	1.27	Long term maintenance
Prolab RMH 3000	22.0	5.0	5.0	6.0	3.20	1.33	Growth and reproduction
Prolab RMH 1000	14.0	6.0	4.5	8.0	3.37	1.31	Long term maintenance
Prolab RMH 2500	23.0	4.5	6.0	8.0	3.04	1.38	Multi-purpose (not breeding)
Certified Rodent Opti-Diet 5136	14.0	2.5	6.0	6.0	3.18	1.30	Balanced diet
Harlan-Teklad (www.teklad.com)							
2014 Global 14% Protein Rodent Maint Diet	14.0	3.5	4.5	4.7	3.10	1.18	Long term maintenance
2016 Global 16% Protein Rodent Diet	16.0	3.5	3.9	5.6	3.20	1.51	Growth and maintenance
2018 Global 18% Protein Rodent Diet	18.0	5.0	3.8	5.9	3.30	1.55	Growth and breeding
8604 Rodent Diet	24.0	4.0	4.5	7.8	3.10	1.35	Full cycle, multi-purpose
8640 22/5 Rodent Diet	22.0	5.0	4.5	7.1	3.11	1.20	Long term maintenance
8760 9F Sterilizable Rodent Diet	24.0	9.0	4.5	8.1	3.24	1.24	High energy diet for breeding
Mazuri (www.mazuri.com)							
Rodent Pellets 5663	23.0	6.5	4.0	8.0	3.27	1.46	Complete diet (including breeding)
Rodent Breeder 6F	16.0	6.0	5.0	N/A	N/A	N/A	Breeder diet (rodents used for food)
Rodent Breeder 9F	16.0	9.0	5.0	N/A	N/A	N/A	Breeder diet (rodents used for food)
Rodent Breeder 11F	16.0	11.0	5.0	N/A	N/A	N/A	Breeder diet (rodents used for food)
Oxbow (www.oxbowhay.com)							
Rodent Maintenance	13.0	2.5	7.0	N/A	N/A	1.66	Long term maintenance
Rodent Performance	20.0	3.5	3.0	N/A	N/A	2.00	Growth and breeding
Kaytee (www.kaytee.com)							
Forti-Diet Mouse & Rat	21.0	4.5	7.0	N/A	N/A	N/A	Basic diet
Supreme Mouse/Rat Daily Blend	15.0	5.0	9.0	N/A	N/A	N/A	Basic diet (needs supplements)
Zupreem (www.zupreem.com)							
Primate Diet	20.0	5.0	2.5	N/A	N/A	N/A	Not formulated for rodents

Source: Information about each product was obtained from the manufacturer's website on 5-15-2003.

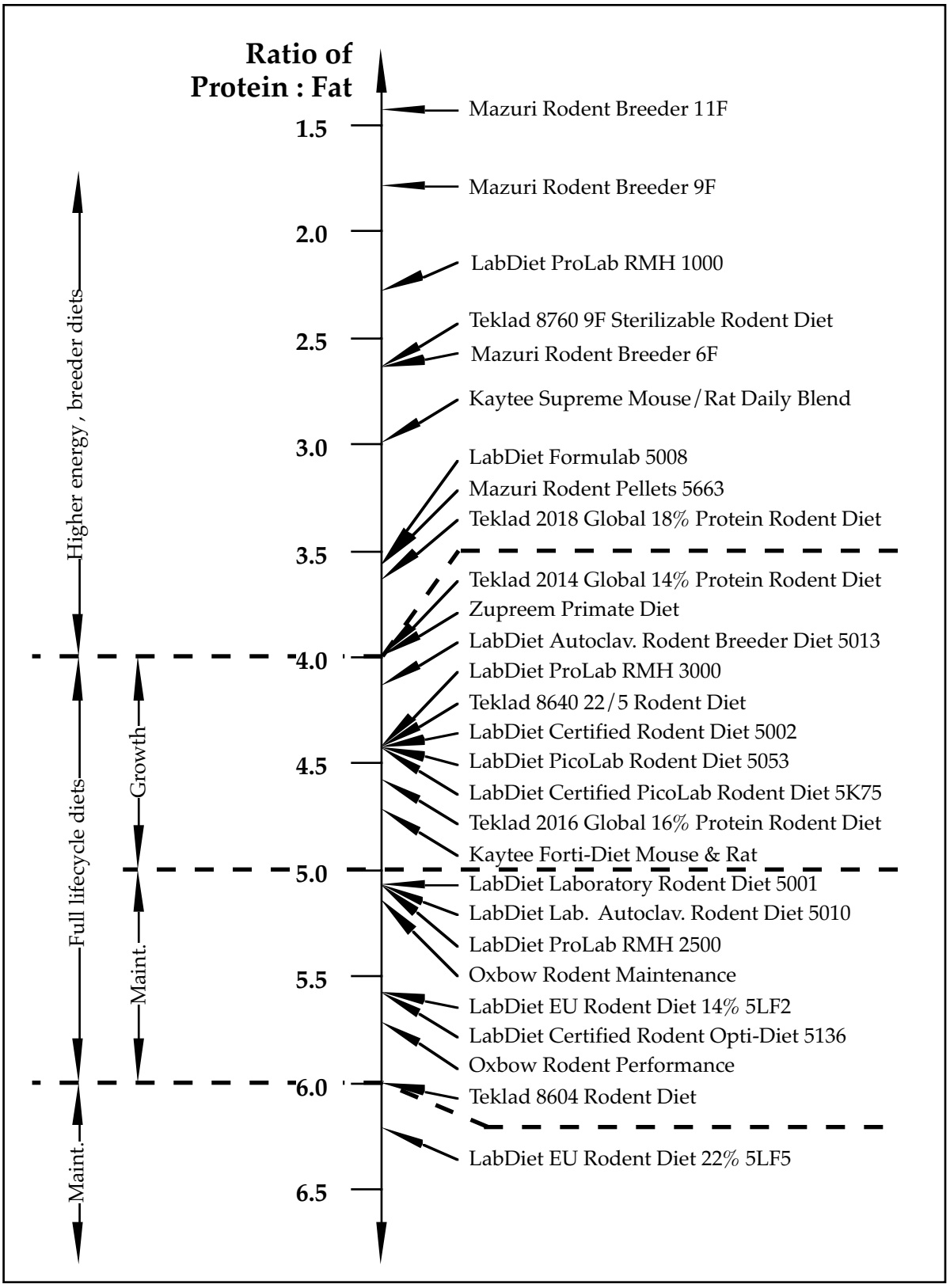


Table C - Ratio of protein to fat in commercially available rodent chow products. (Source: The websites for the various manufacturers.)

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Information sources for the products and manufacturers (as of 6-1-2003):

PMI Nutrition International (a wholly owned subsidiary of Purina Mills Inc.) is the manufacturer of both the LabDiet and Mazuri product lines. Website and contact addresses are as follows. All of the Purina, PMI, LabDiet and Mazuri locations can be reached at (800) 277-8941.

Purina Mills, LLC (www.purina-mills.com)
1401 South Hanley Road
St. Louis, MO 63144-0287
(314) 768-4100, Fax (314) 768-4894

PMI Nutrition International
P.O.Box 66812
St. Louis, MO 63166-6812
(765) 966-1855

LabDiet (www.labdiet.com)
505 North Fourth Street
Richmond, IN 47374
(800) 227-8941

Mazuri (www.mazuri.com)
505 North Fourth Street
Richmond, IN 47374
(800) 227-8941

Harlan Teklad (www.teklad.com)
P.O.Box 44220
Madison, WI 53744-4220
(608) 277-2070 Fax (608) 277-2066

Oxbow Pet Products (www.oxbowhay.com)
29012 Mill Road
Murdock, NE 68407
(800) 249-0366
(402) 867-3222

Kaytee Products, Inc. (www.kaytee.com)
521 Clay Street, P.O.Box 230
Chilton, WI 53014
(800) KAYTEE-1

Premium Nutrition Products, Inc., manufacturer of Zupreem (www.zupreem.com)
P.O.Box 2094
Mission, KS 66202
(800) 345-4767 Fax (913) 438-1881

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Allan Casey is co-founder of WildAgain Wildlife Rehabilitation, Inc. in Evergreen, Colorado. He has rehabilitated over 1,700 squirrels of 17 species since 1986. He has presented widely on wildlife rehabilitation topics, including conducting a two-day seminar on rehabilitating squirrels in North America. Other nutrition related articles are available at WildAgain's website at www.Ewildagain.org, as well as information on WildAgain's new 250+ page Squirrel Rehabilitation Handbook.