Foie gras

Foie gras (/ˌfwɑːˈgrɑː/ , French for "fat liver") is a luxury food product made of the liver of a duck or goose that has been specially fattened. By French law,[1] foie gras is defined as the liver of a duck or goose fattened by force-feeding corn with a feeding tube, a process also known as gavage. In Spain[2] and other countries, it is occasionally produced using natural feeding.[3] Ducks are force-fed twice a day for 12.5 days and geese three times a day for around 17 days. Ducks are typically slaughtered at 100 days and geese at 112 days.[4]

Foie gras is a popular and well-known delicacy in French cuisine. Its flavor is described as rich, buttery, and delicate, unlike that of an ordinary duck or goose liver. Foie gras is sold whole, or is prepared into mousse, parfait, or pâté, and may also be served as an accompaniment to another food item, such as steak. French law states that "Foie gras belongs to the protected cultural and gastronomical heritage of France."[5]

The technique of gavage dates as far back as 2500 BC, when the ancient Egyptians began keeping birds for food and deliberately fattened the birds through force-feeding.[6] Today, France is by far the largest producer and consumer of foie gras, though it is produced and consumed worldwide, particularly in other European nations, the United States, and China.[7]

Gavage-based foie gras production is controversial, due mainly to the animal welfare concerns about force-feeding, intensive housing and husbandry, and enlarging the liver to 10 times its usual

Foie gras

Foie gras with mustard seeds and green onions in duck *jus*

Type	Whole, mousse, parfait, or spread
Main ingredients	Liver of a duck or goose

Cookbook: Foie gras

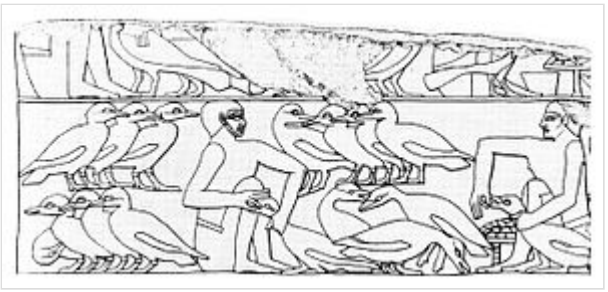
Media: Foie gras

A Mulard duck, the hybrid used most frequently for foie gras production

volume. A number of countries and jurisdictions have laws against force-feeding, and the production, import or sale of foie gras; even where it is legal, a number of retailers decline to stock it.

History

Ancient times



A bas relief depiction of overfeeding geese

As early as 2500 BC, the ancient Egyptians learned that many birds could be fattened through forced overfeeding and began this practice. Whether they particularly sought the fattened livers of birds as a delicacy remains undetermined.[8][9] In the necropolis of Saqqara, in the tomb of Mereruka, an important royal official, there is a bas relief scene wherein workers grasp geese around the necks in order to push food down their throats. At the side stand tables piled with more food pellets, and a flask for moistening the feed before giving it to the geese.[9][10][11]

The practice of goose fattening spread from Egypt to the Mediterranean.[12] The earliest reference to fattened geese is from the 5th century BC Greek poet Cratinus, who wrote of geese-fatteners, yet Egypt maintained its reputation as the source for fattened geese. When the Spartan king Agesilaus visited Egypt in 361 BC, he noted Egyptian farmers' fattened geese and calves.[9][13]

It was not until the Roman period, however, that foie gras is mentioned as a distinct food, which the Romans named *iecur ficatum*;[14][15][16] *iecur* means liver[17] and *ficatum* derives from *ficus*, meaning fig in Latin.[18] The emperor Elagabalus fed his dogs on foie gras during the four years of his reign.[19] Pliny the Elder (1st century AD) credits his contemporary, Roman gastronome Marcus Gavius Apicius, with feeding dried figs to geese in order to enlarge their livers:

> "Apicius made the discovery, that we may employ the same artificial method of increasing the size of the liver of the sow, as of that of the goose; it consists in cramming them with dried figs, and when they are fat enough, they are drenched with wine mixed with honey, and immediately killed."
>
> —Pliny the Elder, *Natural History*, Book VIII. Chapter 77[20]

Hence, the term *iecur ficatum*, fig-stuffed liver; feeding figs to enlarge a goose's liver may derive from Hellenistic Alexandria, since much of Roman luxury cuisine was of Greek inspiration.[21] *Ficatum* was closely associated with animal liver and it became the root word for "liver"[22] in each of these languages: *foie* in French,[23] *hígado* in Spanish, *fígado* in Portuguese, *fegato* in Italian, *fetge* in Catalan and Occitan and *ficat* in Romanian, all meaning "liver"; this etymology has been explained in different manners.[24][25]

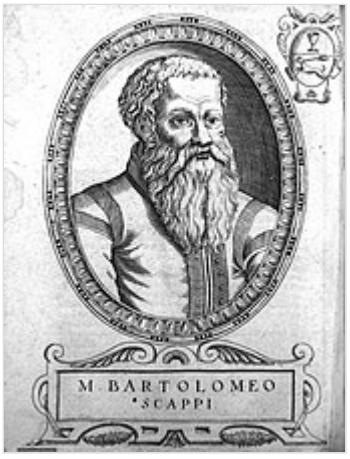
Postclassical Europe

After the fall of the Roman empire, goose liver temporarily vanished from European cuisine. Some claim that Gallic farmers preserved the foie gras tradition until the rest of Europe rediscovered it centuries later, but the medieval French peasant's food animals were mainly pig and sheep.[26] Others claim that the tradition was

preserved by the Jews, who learned the method of enlarging a goose's liver during the Roman colonisation of Judea[27] or earlier from Egyptians.[28] The Jews carried this culinary knowledge as they migrated farther north and west to Europe.[27]

The Judaic dietary law, Kashrut, forbade lard as a cooking medium, and butter, too, was proscribed as an alternative since Kashrut also prohibited mixing meat and dairy products.[12] Jewish cuisine used olive oil in the Mediterranean, and sesame oil in Babylonia, but neither cooking medium was easily available in Western and Central Europe, so poultry fat (known in Yiddish as *schmaltz*), which could be abundantly produced by overfeeding geese, was substituted in their stead.[27][29][30] The delicate taste of the goose's liver was soon appreciated; Hans Wilhelm Kirchhof of Kassel wrote in 1562 that the Jews raise fat geese and particularly love their livers. Some Rabbis were concerned that eating forcibly overfed geese violated Jewish food restrictions. The chasam sofer, Rabbi Moses Sofer, contended that it is not a forbidden food (treyf) as none of its limbs are damaged. This matter remained a debated topic in Jewish dietary law until the Jewish taste for goose liver declined in the 19th century.[27] Another kashrut matter, still a problem today, is that even properly slaughtered and inspected meat must be drained of blood before being considered fit to eat. Usually, salting achieves that; however, as liver is regarded as "(almost) wholly blood", broiling is the only way of kashering. Properly broiling a foie gras while preserving its delicate taste is difficult, and therefore rarely practiced. Even so, there are restaurants in Israel that offer grilled goose foie gras. Foie Gras also bears resemblance to the Jewish food staple, chopped liver.[30]

Appreciation of fattened goose liver spread to gastronomes outside the Jewish community, who could buy in the local Jewish ghetto of their cities. In 1570, Bartolomeo Scappi, chef de cuisine to Pope Pius V, published his cookbook *Opera*, wherein he describes that "the liver of [a] domestic goose raised by the Jews is of extreme size and weighs [between] two and three pounds."[31] In 1581, Marx Rumpolt of Mainz, chef to several German nobles, published the massive cookbook *Ein Neu Kochbuch*, describing that the Jews of Bohemia produced livers weighing more than three pounds; he lists recipes for it—including one for goose liver mousse.[31][32] János Keszei, chef to the court of Michael Apafi, the prince of Transylvania, included foie gras recipes in his 1680 cookbook *A New Book About Cooking*, instructing cooks to "envelop the goose liver in a calf's thin skin, bake it and prepare [a] green or [a] brown sauce to accompany it. I used goose liver fattened by Bohemian Jews, its weight was more than three pounds. You may also prepare a mush of it."



Bartolomeo Scappi

Production and sales

In the 21st century, France is by far the largest producer and consumer of foie gras, though it is produced and consumed in several other countries worldwide, particularly in some other European nations, the United States, and China.[7] Approximately 30,000 people are members of the French foie gras industry, with 90% of them residing in the Périgord (Dordogne), the Aquitaine régions in the southwest, and Alsace région in the east. The European Union recognizes the foie gras produced according to traditional farming methods (*label rouge*) in southwestern France with a geographical indication of provenance.

try	Production (tons, 2005)	% of total (2005)	Production (tons, 2014)	% of total (2014)[4]
e	18,450[33]	78.5%	18,750[4]	78.5%
ary	1,920[33]	8.2%		8.0%
ria	1,500[33]	6.4%		6.0%
d s	340 (2003)[34]	1.4%		1.4%
da	200 (2005)[35]	0.9%		1.0%
	150[33]	0.6%		0.6%
s	940	4.0%		4.5%
al	**23,500**[33]	**100%**		

Hungary is the world's second-largest foie gras (*libamáj*) producer and the largest exporter. France is the principal market for Hungarian foie gras – mainly exported raw. Approximately 30,000 Hungarian goose farmers are dependent on the foie gras industry.[36] French food companies spice, process, and cook the foie gras so it may be sold as a French product in its domestic and export markets.[37]

Pre 2000

Some countries have produced foie gras only sporadically in the past. For example, in 1996, Turkey had a peak year of production with 20 tonnes of foie gras valued at US$39,000 being exported.[38]

2005

In 2005, France produced 18,450 tonnes of foie gras (78.5% of the world's estimated total production of 23,500 tonnes) of which 96% was duck liver and 4% goose liver. Total French consumption of foie gras in this year was 19,000 tonnes.[33] In 2005, Hungary, the world's second-largest foie gras producer exported 1,920 tonnes[36] and Bulgaria produced 1,500 tons of foie gras.[33]

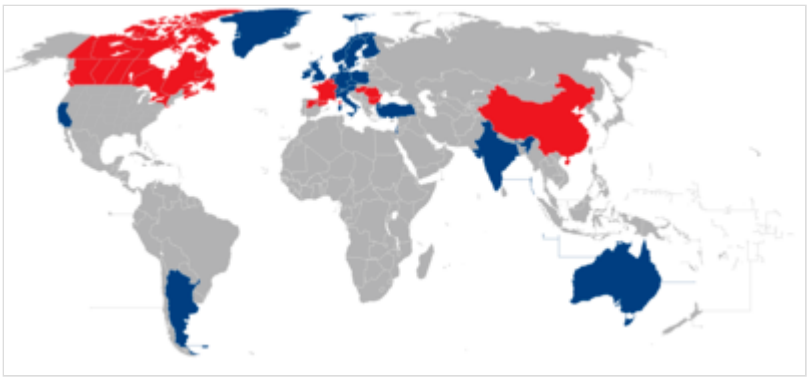
The demand for foie gras in the Far East is such that China has become a sizeable producer. Madagascar is a small but rapidly growing producer of high quality foie gras.[39]

2011

In 2011 in Bulgaria (which started production in 1960), 5 million mule ducks were raised for foie gras on 800 farms. This figure makes Bulgaria the second largest producer in Europe.[43]

2012

In 2012, France produced around 19,000 tonnes of foie gras representing 75% of the world's production in that year. This required the force-feeding of around 38 million ducks and geese.[44] World production in 2015 is estimated as 27,000 tonnes.[45]



Countries and regions where the production of foie gras is banned

Main countries and regions producing foie gras [40][41][42]

2014–2015

In 2014, the whole of the EU produced approximately 25,000 tonnes of foie gras – 23,000 tonnes of duck foie gras and 2,000 tonnes of goose foie gras.[46] The same year, France was producing 72% of world foie gras production of which 97% was from ducks.[47]

In 2015, it was reported that in France, sales of foie gras may be waning and an OpinionWay poll found that 47% of the French population supported a ban on force-feeding.[48][49]

Foie Gras served with Hawthorn puree at a restaurant in Beijing

2015-2016

In 2016, it was reported that France produces an estimated 75% of the world's foie gras and southwestern France produces approximately 70% of that total. In 2016, it can retail for upwards of $65 a pound.[50]

In late 2015, there were several outbreaks of the highly contagious H5N1 bird flu in France, which escalated during 2016. This led to Algeria, China, Egypt, Japan, Morocco, South Korea, Thailand and Tunisia banning French poultry exports, including foie gras, and France to initiate increased bio-security protocols which will cost an estimated 220 million euros. One of these measures was the halting of production in southwestern France from early April, 2016 for an anticipated period of three months to reduce the spread of the virus. Exports of foie gras from France are expected to decrease from 4,560 tonnes in 2015 to 3,160 tonnes in 2016.[50][51][52]

In the United States, the largest producer is Hudson Valley Foie Gras, which uses approximately 350,000 ducks each year.[53]

Forms

In France, foie gras exists in different, legally defined presentations, ordered by expense:[54]

- *foie gras entier* (whole foie gras), made of one or two whole liver lobes; either cuit (*cooked*), mi-cuit (*semi-cooked*), or frais (*fresh*);
- *foie gras*, made of pieces of livers reassembled together;
- *bloc de foie gras*, a fully cooked, moulded block composed of 98% or more foie gras; if termed *avec morceaux* ("with pieces"), it must contain at least 50% foie gras pieces for goose, and 30%

for duck.

An entire foie gras (partly prepared for a terrine)

Additionally, there is *pâté de foie gras*, *mousse de foie gras* (either must contain 50% or more foie gras), *parfait de foie gras* (must contain 75% or more foie gras); and other preparations (no legal obligation established).

Fully cooked preparations are generally sold in either glass containers or metal cans for long-term preservation. Whole, fresh foie gras is usually unavailable in France outside the Christmas period, except in some producers' markets in the producing regions. Frozen whole foie gras sometimes is sold in French supermarkets.

A Moulard duck foie gras torchon with pickled pear

Whole foie gras is readily available from gourmet retailers in Canada, the United States, Hungary, Argentina and regions with a sizeable market for the product. In US, raw foie gras is classified as Grade A, B or C. Grade A is typically the highest in fat and especially suited for low-temperature preparation, because the veins are relatively few and the resulting terrine will be more aesthetically appealing because it displays little blood. Grade B is accepted for higher temperature preparation, because the higher proportion of protein gives the liver more structure after being seared. Grade C livers are generally reserved for making sauces as well as other preparations where a higher proportion of blood-filled veins will not impair the appearance of the dish.

Production methods

Species, breeds and sex used

Geese

Traditionally, foie gras was produced from special breeds of geese. However, by 2004, geese accounted for less than 10% of the total global foie gras production[55] and by 2014 only 5% of total French production.[56] Goose breeds used in modern foie gras production are primarily the grey Landes goose (*Anser anser*)[56] and the Toulouse goose.[57][58]

In 2016, Hungary was producing 80% of the world's goose foie gras, however, production rates are likely to drop in 2017 due to outbreaks of bird flu.[59]

Ducks

In 2014, ducks accounted for 95% of foie gras production.[56] The breeds primarily used are the Muscovy duck (*Cairina moschata*)[56] (also called the Barbary duck) and the hybrid cross of a male Muscovy duck and a female Pekin duck (*Anas platyrhynchos domestica*) called the Mulard duck.[56] This hybrid is sterile and is therefore sometimes referred to as a "mule" duck. Mulards are estimated to account for about 35% of all foie gras consumed in the US.[60] About 95% of duck foie gras production from France comes from force fed Mulards and the remaining 5% from the Muscovy duck.[61]

After hatching, the Mulard ducklings are sexed. Males put on more weight than females, so the females are slaughtered, sometimes in an industrial macerator. Up to 40 million female ducks may be killed in this way. The remains of female ducklings are later used in cat food, fertilisers and in the pharmaceutical industry.[62]

Physiological basis

The ideology behind foie gras production is the ability that some waterfowl have to expand their esophagus and to gain weight, particularly in the liver, in preparation for migration.[63] Unlike many birds, geese and ducks lack a crop. In the wild, esophageal dilation allows them to swallow large foodstuffs, such as a whole fish, for later digestion. Wild geese may consume 300 grams of protein and another 800 grams of grasses per day. Farmed geese allowed to graze on carrots adapt to eating 100 grams of protein, but may consume up to 2500 grams of the carrots per day. The increasing amount of feed given prior to force-feeding and during the force-feeding itself cause expansion of the lower part of the esophagus.[60]

Individual cages are used in some farms producing foie gras.

Pre-force feeding phase

The pre-force feeding phase consists of three stages.[56]

- The first stage ("start-up") lasts from 1 to 28 days-of-age (0–4 weeks). During this stage, the young birds are housed in large, indoor groups (e.g. 2,100[61]) usually on straw.
- The second stage ("growth") lasts from 28 to 63 days-of-age (4–9 weeks). The birds are moved outside to feed on grasses *ad libitum*. The birds are given additional feed, but access to this is limited by time. This stage aims to take advantage of the natural dilation capacity of the esophagus of some wildfowl.[64]
- The third stage ("pre-fattening") lasts from 63 to 90 days-of-age (9–13 weeks). The birds are brought inside for gradually longer periods while introduced to a high starch diet. This is a feeding transition where the food is distributed by meals, first in restricted amount and time and thereafter greatly increased.

Force-feeding phase

The next production phase, which the French call *gavage* or *finition d'engraissement*, or "completion of fattening", involves forced daily ingestion of controlled amounts of feed for 12 to 15 days with ducks and for 15 to 18 days with geese. During this phase, ducks are usually fed twice daily while geese are fed up to three times daily. To facilitate handling of ducks during gavage, these birds are typically housed throughout this phase in individual cages or small group pens.

Typical foie gras production involves force-feeding birds more food than they would eat in the wild, and much more than they would voluntarily eat domestically.[65]

In modern production, the bird is typically fed a controlled amount of feed, depending on the stage of the fattening process, the bird's weight and the amount of feed the bird last ingested.[66] At the start of production, a bird might be fed a dry weight of 250 grams (9 oz) of food per day and up to 1,000 grams (35 oz) (in dry

weight) by the end of the process. The actual amount of food force-fed is much greater, because the birds are fed a mash with a composition of about 53% dry and 47% liquid (by weight).[67]


Modern *gavage* feeding process

The feed is administered using a funnel fitted with a long tube (20–30 cm long), which forces the feed into the bird's esophagus. If an auger is used, the feeding takes about 45 to 60 seconds, however, modern systems usually use a tube fed by a pneumatic pump with an operation time of 2 to 3 seconds per duck. During feeding, efforts are made to avoid damaging the bird's esophagus, which could cause injury or death, although researchers have found evidence of inflammation of the walls of the proventriculus after the first session of force-feeding.[68] There is also indication of inflammation of the esophagus in the later stages of fattening.[69] Several studies have also demonstrated that mortality rates can be significantly elevated during the gavage period.[70][71][72]

The feed, usually corn boiled with fat (to facilitate ingestion), deposits large amounts of fat in the liver, thereby producing the buttery consistency sought by some gastronomes.

Ducks reared for foie gras are typically slaughtered at 100 days of age and geese at 112 days.[4] At this time, the bird's liver is 6 to 10 times its ordinary size.[73] Storage of fat in the liver produces steatosis of the liver cells.

Alternative production

Fattened liver can be produced by alternative methods without gavage, and this is often referred to either as "fatty goose liver" or as foie gras (outside France), though it does not conform to the French legal definition. This method involves timing the slaughter to coincide with the winter migration, when livers are naturally fattened.[74]

The winner of the Coup de Coeur award at the Salon International d'Alimentation, SIAL 2006, Patería de Sousa produces fattened livers without force-feeding.[75][76][77][78] This has only recently been produced commercially, and is a very small fraction of the market.

Producers outside France do not always force-feed birds to produce fattened livers considered to be foie gras, instead allowing them to eat freely, termed *ad libitum*. Interest in alternative production methods has grown recently due to ethical concerns in gavage-based foie gras production. Such livers are alternatively termed fatty goose liver, ethical foie gras, or humane foie gras. The British supermarket chain Waitrose also provides a version of ethical foie gras which it calls (and has been trademarked) *faux gras*.[79] This is not to be confused with the American product by the same name, produced by Regal Vegan, which has the U.S. trademark for *faux gras*, and is actually a vegan, nut-based spread.[80]

The term *ethical foie gras* or *humane foie gras* is also used for gavage-based foie gras production that is more concerned with the animal's welfare (using rubber hoses rather than steel pipes for feeding). Others have expressed skepticism at these claims of humane treatment,[81] as earlier attempts to produce fattened livers without gavage have not produced satisfactory results.[82]

More radical approaches have been studied. A duck or goose with a ventromedian hypothalamic (VMH) lesion will tend not to feel satiated after eating, and will therefore eat more than a non-lesioned animal. By producing such lesions surgically, it is possible to increase the bird's food consumption when permitted to eat *ad libitum*, by a factor of more than two.[83]

Preparations

Generally, French preparations of foie gras are made over low heat, as fat melts faster from the traditional goose foie gras than the duck foie gras produced in most other parts of the world. American and other New World preparations, typically employing duck foie gras, have more recipes and dish preparations for serving foie gras hot, rather than cool or cold.


Foie gras with shallots and figs

In Hungary, goose foie gras traditionally is fried in goose fat, which is then poured over the foie gras and left to cool; it is also eaten warm, after being fried or roasted, with some chefs smoking the foie gras over a cherry wood fire.

In other parts of the world foie gras is served in dishes such as foie gras sushi rolls, in various forms of pasta or alongside steak tartare or atop a steak as a garnish.

Cold preparations

Traditional low-heat cooking methods result in terrines, *pâtés*, parfaits, foams and mousses of foie gras, often flavored with truffle, mushrooms or brandy such as cognac or armagnac. These slow-cooked forms of *foie gras* are cooled and served at or below room temperature.

In a very traditional form of terrine, *au torchon* ("in a towel"), a whole lobe of foie is molded, wrapped in a towel and slow-cooked in a *bain-marie*. For added flavor (from the Maillard reaction), the liver may be seared briefly over a fire of grape vine clippings (*sarments*) before slow-cooking in a bain-marie; afterwards, it is pressed served cold, in slices.

Raw foie gras is also cured in salt ("*cru au sel*"), served slightly chilled.[84]

A pastry containing fatty goose liver and other ingredients is known as the "Strasburg pie" since Strasbourg was a major producer of foie gras.[85] The pie is mentioned in William Makepeace Thackeray's novel *Vanity Fair* as being popular with the diplomatic corps.[86]

Hot preparations

Given the increased internationalization of cuisines and food supply, *foie gras* is increasingly found in hot preparations not only in the United States, but in France and elsewhere. Duck foie gras ("*foie gras de canard*") has slightly lower fat content and is generally more suitable in

Pâté de foie gras, canned

Nutritional value per 100 g (3.5 oz)	
Energy	1,933 kJ (462 kcal)
Carbohydrates	4.67 g
Dietary fiber	0.0 g

texture to cooking at high temperature than is goose foie gras ("*foie gras d'oie*"), but chefs have been able to cook goose *foie gras* employing similar techniques developed for duck, albeit with more care.

Fat	43.84 g	
Protein	11.40 g	
Vitamins	**Quantity**	**%DV**†
Thiamine (B_1)	0.088 mg	7%
Riboflavin (B_2)	0.299 mg	23%
Niacin (B_3)	2.51 mg	16%
Minerals	**Quantity**	**%DV**†
Sodium	697 mg	30%

†Percentages estimated using US recommendations for adults.[87]

Raw foie gras can be roasted, sauteed, pan-seared (*poêlé*) or (with care and attention), grilled. As foie gras has high fat content, contact with heat needs to be brief and therefore at high temperature, lest it burn or melt. Optimal structural integrity for searing requires the foie gras to be cut to a thickness between 15 and 25 mm (½ – 1 inch), resulting in a rare, uncooked center. Some chefs prefer not to devein the foie gras, as the veins can help preserve the integrity of the fatty liver. It is increasingly common to sear the *foie gras* on one side only, leaving the other side uncooked. Practitioners of molecular gastronomy such as Heston Blumenthal of The Fat Duck restaurant first flash-freeze foie gras in liquid nitrogen as part of the preparation process.[88]

Hot foie gras requires minimal spices; typically black pepper, paprika (in Hungary) and salt. Chefs have used fleur de sel as a gourmet seasoning for hot foie gras to add an "important textural accent" with its crunch.[89]

Consumption

Foie gras is a regarded as a gourmet luxury dish.[90] In France, it is mainly consumed on special occasions, such as Christmas or New Year's Eve *réveillon* dinners, though the recent increased availability of foie gras has made it a less exceptional dish.[91] In some areas of France *foie gras* is eaten year-round.

Duck foie gras is the slightly cheaper[91] and, since a change of production methods in the 1950s to battery, by far the most common kind, particularly in the US. The taste of duck foie gras is often referred to as musky with a subtle bitterness. Goose foie gras is noted for being less gamey and smoother, with a more delicate flavor.[92]

Animal welfare

Gavage-based foie gras production is controversial due to the animal welfare consequences of the force-feeding procedure, intensive housing and husbandry, an enlarged liver and the potential for being detrimental to human health. Some countries find foie gras to be "morally objectionable".[93] One EU committee report noted that up to 1998, there was only a small number of scientific studies on the welfare of birds used for foie gras production, however, the Committee found sufficient evidence to conclude that "force-feeding, as currently practised, is detrimental to the welfare of the birds."[94] The industry repeatedly faces accusations of torture and cruelty.[53]

Gavage feeding

Suitability of breeds and species

The production of foie gras occurs on the argument that migrating wildfowl seasonally eat such that their liver naturally enlarges. However, the bird used predominantly in foie gras production is a hybrid of a male Muscovy duck and a female Pekin duck. It has been noted that the Muscovy duck is non-migratory,[95] and both the Pekin

and the mulard hybrid cannot fly.[96] Domestic ducks (including the Pekin) are derived from the mallard duck, which is sometimes migratory and sometimes not. Therefore, although the domestic goose might well be adapted to store food before migration, it is less likely that the Mulard hybrid duck has the same potential.[94]

Force-feeding procedure

In modern gavage-based foie gras production, force-feeding takes place for between 17 and 30 days before slaughter.[97]

Fear

Geese and ducks show avoidance behaviour (indicating aversion) of the person who feeds them and the feeding procedure.[94][97] Although an EU committee in 1998 reported seeing this aversion, they noted that at the time, there was no "conclusive" scientific evidence on the aversive nature of force-feeding.[94] The AVMA (Animal Welfare Division) when considering foie gras production stated "The relatively new Mulard breed used in foie gras production seems to be more prone than its parent breeds to fear of people".[97]

Injury

An EU committee in 1998[94] reported that there was usually clear evidence of tissue damage in the oesophagus of birds which had been gavage fed, although one 1972 study cited by the report observed no alteration of the oesophageal tissue. More recent scientific studies have shown that the esophagus of birds can be injured or inflamed by gavage feeding.[60][97][98][99]

Stress

After measuring a range of physiological parameters in male Mulard ducks, it was concluded in one study that the acute stress caused by force feeding is similar at the beginning and end of the commercial production of foie gras.[100] A similar study on Muscovy ducks found that gavage feeding was related to an increase in panting behaviour and serum corticosterone levels, indicating increased stress attributable to this feeding method.[101]

Housing and husbandry

In France, at the end of 2015, individual cages were prohibited to improve animal welfare. They will be replaced by cages which house 4 to 5 birds.[61]

Behavioural restriction

During the force-feeding period, the birds are kept in individual cages, with wire or plastic mesh floors, or sometimes in small groups on slatted floors. Individual caging restricts movements and behaviours by preventing the birds from standing erect, turning around, or flapping their wings. Birds cannot carry out other natural waterfowl behaviours, such as bathing and swimming.[60] Furthermore, ducks and geese are social animals and individual cages prevent such interactions.[94]

During the force feeding period, when the birds are not being fed, they are sometimes kept in near darkness; this prevents normal investigatory behaviour and results in poor welfare.[94]

Injury

Lesions can occur on the sternum of the birds due to necrosis of the skin. This is observed more frequently in birds reared in cages rather than on the floor. The prevalence is higher in Mulard ducks (40–70%) compared to under 6% in Muscovy ducks. This is due to the larger pectoralis profundus major and minor muscles in Muscovy ducks compared to Mulards.[94] The relatively new Mulard breed used in foie gras production seems more prone to developing lesions in the area of the sternum when kept in small cages, and to bone breakage during transport and slaughter.[97]

Where ducks are fattened in group pens, it has been suggested that the increased effort required to capture and restrain ducks in pens might cause them to experience more stress during force feeding. Injuries and fatalities during transport and slaughter occur in all types of poultry production, however, fattened ducks are more susceptible to conditions such as heat stress.

Enlarged liver

Foie gras production results in the bird's liver being swollen. In some species of ducks, liver size changes seasonally, increasing by as much as 30 to 50%, with more pronounced changes in females. However, foie gras production enlargens the livers up to 10 times their normal size.[60][97] This impairs liver function due to obstructing blood flow, and expands the abdomen making it difficult for the birds to breathe.[97] Death occurs if the force-feeding is continued.[4][94]

Mortality rates

The mortality rate in force-fed birds varies from 2% to 4%, compared with approximately 0.2% in age-matched, non-force-fed drakes.[60] Mortality rates do not differ between the force-feeding period and the previous rearing phase, with both being approximately 2.5%.[61]

Controversy

The polarising and controversial nature of foie gras production was identified in a paper that juxtaposed the views of "foie gras production as the apotheosis of murderous meat production, and those who consider it to be a co-production between humans and animals".[102]

Animal rights and welfare advocates such as PETA,[103] Viva!,[104] and the Humane Society of the United States[105] contend that foie gras production methods, and force-feeding in particular, constitute cruel and inhumane treatment of animals.

An Ipsos MORI poll found that 63% of the UK population would like to see a complete ban on the sale of foie gras in the UK.[106]

In April–May 2013, an investigator from Mercy for Animals recorded undercover video at Hudson Valley Foie Gras farm in New York state. The video showed workers forcefully pushing tubes down ducks' throats. One worker said of the force-feeding process: "Sometimes the duck doesn't get up and it dies. There have been times

that 20 ducks were killed." Hudson Valley operations manager Marcus Henley replied that the farm's mortality statistics are not above average for the poultry industry.[107] Because Hudson Valley provides foie gras to Amazon.com, Mercy for Animals began a campaign urging Amazon to stop selling foie gras, a move that has already been made by Costco, Safeway, and Target.[108]

In November 2013, the *Daily Mirror* published a report based on the video they obtained depicting cruelty towards ducks in a farm owned by French firm Ernest Soulard, which is a supplier to celebrity chef Gordon Ramsay's restaurants. The restaurant chain suspended purchasing from the supplier following the exposé.[109]

Animal research

The process of force-feeding can make animals sick by stressing the liver. If the stress is prolonged, excess protein may build up and clump together as amyloids, consumption of which has been found to induce amyloidosis in laboratory mice. It has been hypothesized this may be a route of transmission in humans too and so be a risk for people with inflammatory complaints such as rheumatoid arthritis.[110]

Legislation and bans

A number of countries and regions have laws against force-feeding or the sale or importation of foie gras, and even where it is legal some retailers have ceased to sell it.[111][112][113]

In 2017, foie gras production was banned in Brussels - the capital of Belgium, which is one of the few remaining countries that produces foie gras.[114]

Humane Foie Gras

A more humane version of foie gras was pioneered in the Spanish region of Extremadura, whereby the bird is tricked into preparing for migration rather than force-fed.[115]

See also

- Shen Dzu – the fattening of pigs in manner similar to gavage
- List of delicacies
- List of duck dishes
- Ortolan bunting
- Specialty foods

Notes

1. French rural code Code rural – Article L654-27-1 (http://legifrance.gouv.fr/affichCodeArticle.do;jsessionid=943EF0198AA70E691D551179EB5E5A83.tpdjo05v_3?idArticle=LEGIARTI000006584967&cidTexte=LEGITEXT000006071367&dateTexte=20091223): ["*On entend par foie gras, le foie d'un canard ou d'une oie spécialement engraissé par gavage.*"] Error: {{Lang}}: text has italic markup (help) ("'Foie gras' is understood to mean the liver of a duck or a goose that has been specially fattened by gavage, also served with toast").
2. The Perennial Plate: Episode 121: A Time for Foie. [1] (http://www.theperennialplate.com/episodes/2013/06/episode-121-a-time-for-foie/). June 2013.

3. Ted Talks: Dan Barber's foie gras parable. [2] (http://www.ted.com/talks/dan_barber_s_surprising_foie_gras_parable.html). July 2008.
4. "Torture in a tin: Viva! foie-gras fact sheet" (https://web.archive.org/web/20150214203009/http://www.viva.org.uk/sites/default/files/2014_mini_foiegras_factsheet_1.pdf) (PDF). Viva!. 2014. Archived from the original (http://www.viva.org.uk/sites/default/files/2014_mini_foiegras_factsheet_1.pdf) (PDF) on 14 February 2015. Retrieved 14 February 2015. {{cite web}}: Unknown parameter |deadurl= ignored (|url-status= suggested) (help)
5. French rural code L654-27-1 (http://www.legifrance.gouv.fr/WAspad/UnArticleDeCode?commun=&code=CRURALNL.rcv&art=L654-27-1)
6. "Ancient Egypt: Farmed and domesticated animals" (http://www.reshafim.org.il/ad/egypt/timelines/topics/domesticated_animals.htm).
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8. (McGee 2004, p. 167): "*Foie gras is the "fat liver" of force-fed geese and ducks. It has been made and appreciated since Roman times and probably long before; the force-feeding of geese is clearly represented in Egyptian art from 2500 BC.*"
9. (Toussaint-Samat 1994, p. 425).
10. (Ginor 1999, p. 2).
11. "Saudi Aramco World : Living With the Animals" (http://www.saudiaramcoworld.com/issue/200104/living.with.the.animals.htm).
12. (Alford 2001, p. 36).
13. (Ginor 1999, p. 3).
14. Sagar, Khan (12 February 2015). "About the history of foie gras" (https://www.foiegrasgourmet.com/en/the-foie-gras-history). *www.foiegrasgourmet.com*. Foie Gras Gourmet. Retrieved 27 February 2017.
15. (Ginor 1999, p. 4).
16. (Giacosa 1994, p. 13).
17. (Langslow 2000, p. 153): "*A second instance of the restriction of the sense of a Latin anatomical term to animals is* iecur *'the liver' in Theodorus and Cassius. In both, the human liver is always* hepar*, while* iecur *is used of an animal (...)*"
18. "Ficus,i" (...) Derivés: (...) *ficatum* n. (sc. iecur): d'abord terme de cuisine "foie garni de figues", cf. Hor., S. 2, 8, 88, *ficis pastum iecur anseris albae*, calque du gr. συκωτόν de même sens, puis, dans le langage populaire, simplement "foie" (...) et passé avec ce sens dans les langues romanes, où ficatum a remplacé *iecur*. A. Ernout, A. Meillet, *Dictionnaire etymologique de la langue latine*, Éd. Klincksieck, Paris 1979.
19. (Toussaint-Samat 1994, p. 426).
20. Pliny the Elder, *The Natural History* (eds. (http://www.perseus.tufts.edu/cgi-bin//ptext?lookup=Plin.+Nat.+8.77)John Bostock, Henry Thomas Riley). Archived (https://web.archive.org/web/20050213035835/http://www.perseus.tufts.edu/cgi-bin/) 13 February 2005 at the Wayback Machine For the original Latin text, see here (http://penelope.uchicago.edu/Thayer/L/Roman/Texts/Pliny_the_Elder/8*.html). The Latin text (ed. Karl Friedrich Theodor Mayhoff) of Perseus Digital Library places the corresponding text in a wrong chapter. URL accessed December 30, 2006.
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23. (Walter 2006, p. 40): "*(...) for example, why it is not the word JECUR (a Latin word taken from the Greek) which has come down to us with the meaning of 'liver', but the Romance word* ficato*, which has become the French* foie*. The word* ficato *is formed on the Latin word FICUS 'fig', and would appear to have nothing to do with the 'liver' other than the Greeks, followed by the Romans, fattened their geese with figs to obtain particularly fleshy and tasty livers. The FICATUM JECUR or 'fig-fattened goose liver', which was very much sought after, must have become such a common expression that it was shortened to FICATUM (just as the modern French say* frites *as an abbreviation of* pommes de terre frites*). To begin with the word FICATUM probably designated only edible animal livers, with its meaning then being extended to include the human organ.*"
24. (Littré 1863, p. 137): "*Feûte n'est pas mieux fait que* foie*; seulement, il conserve le* t *du Latin; car on sait que* foie *vient de* ficatum *(foie d'une oie nourrie de figues, et, de là, foie en général).* Foie *en français,* feûte *en wallon,* fetge *en provençal,* fégato *en italien,* hígado *en espagnol,* fígado *en portugais, témoignent que la bouche romane déplaça l'accent du mot Latin, et, au lieu de* ficátum*, qui est la prononciation régulière, dit, par anomalie,* fícatum *avec l'accent sur l'antépénultième.*"
25. Dizionario etimologico online: fégato (http://www.etimo.it/?term=fegato&find=Cerca).
26. (Ginor 1999, p. 8).
27. (Ginor 1999, p. 9).
28. (Davidson 1999, p. 311): "*The enlarged liver has been counted a delicacy since classical times, when the force-feeding of the birds was practised in classical Rome. It is commonly said that the practice dates back even further, to ancient Egypt, and that knowledge of it was possibly acquired by the Jews during their period of 'bondage' there and transmitted by them to the classical civilizations.*"
29. (Alford 2001, p. 37).
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31. (Ginor 1999, p. 11).
32. (Toussaint-Samat 1994, p. 427).
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External links

- Video of foie gras production. (https://www.mirror.co.uk/news/uk-news/video-cruelty-chef-gordon-ramsays-2688593)

Scientific studies

- Report of the EU Scientific "Committee on Animal Health and Animal Welfare on Welfare Aspects of the Production of Foie Gras in Ducks and Geese" (http://ec.europa.eu/food/animal/welfare/international/out17_en.pdf) (PDF). (277 KiB)

Alternatives

- Foie Gras without force-feeding (http://news.bbc.co.uk/1/hi/magazine/6301715.stm)
- Faux Gras – "Foie Gras Without The Cruelty" (http://news.scotsman.com/uk.cfm?id=1883412007)
- Chef Dan Barber tells the story of a small farm in Spain that has found a humane way to produce foie gras (http://www.ted.com/index.php/talks/dan_barber_s_surprising_foie_gras_parable.html)
- Can Ethical Foie Gras Happen in America? (http://www.time.com/time/nation/article/0,8599,1915601,00.html) TIME, 12 August 2009
