These various life-history strategies have very important consequences. Short-lived species can quickly exploit a new environment if food resources are plentiful and produce many offspring in a few weeks: farmers painfully know that innumerable mice can infest their silos very quickly. By contrast, long-lived species need a long time to colonise a land: despite their will, European pioneers needed decades, if not centuries, to populate America.

3.2.1.1 Only Some Species Increase Their Lifespan When Facing Food Shortage

A consequence of these diverging life-history strategies is that longevity cannot evolve independently from the other life-history traits because it "is the product of an evolutionary history that established the tempo of growth, development and maturation needed to survive and reproduce."[10] Mice live only for a very few years while humans can live for *ca.* 120 years at a maximum and these values have been selected during the course of evolution. This suffices to argue that the hypothesis that people born in 2000 could live for 5000 years[11] is mere fantasy, and that human lifespan cannot increase to a great extent because of these relationships between life-history traits.[12]

A second consequence, which is crucial if one wishes to extend to human beings the results showing a longevity increase in animal models, is that short- and long-lived mammals differ in their strategy to cope with food shortages. In short-lived mammals living in the wild, such as rats or mice, median lifespan can be less than half a year[13] and thus there is only one reproductive season. For these species plagued with a high predation, the best strategy to save reproduction in the event of famine is probably to stay in the same place and to live up to the end of the starvation period, or even to the next reproductive season, *i.e.* to the next year. Therefore, the mean lifespan of diet-restricted mice is expected to increase for a maximum of one year, *i.e.* the time until the next reproductive season.[14] In large and long-lived species facing a lower predatory load, another strategy can be emigration to discover new food sources and/or to delay reproduction. These species can afford this delay because they do not reproduce only once but repeatedly in successive years. For these species, there is thus no selective ground for an increased lifespan in the event of food scarcity because this increase is useless since other strategies are at hand.[15]

A way to test whether long-lived species live longer under diet restriction could be to observe the lifespan of long-lived primates subjected to diet restriction. Diet-restricted rhesus macaques have been reported not to live longer than control ones[16] or to live *ca.* 2 years longer.[17] It has been argued that the control group of the former study had a low weight when compared to usual results, and thus that this control group was maybe not *ad libitum*-fed but slightly diet-restricted, but it has also been stressed that the "question remains if *ad libitum* feeding is more an obesity model than a normal feeding state in primates."[18] Therefore, the evidence in favour of a lifespan increase in diet-restricted long-lived mammals is scarce.