

### Required readings - Journal abstracts and synopses

#### Unit 2 - The Near East Case Study

##### Early plant domestication and domesticates

1. Kislev, M. E. E. Weiss and A. Hartmann  
2004 Impetus for sowing and the beginning of agriculture: Ground collecting of wild cereals.  
*Proceedings of the National Academy of Sciences USA* 101(9):2692–2695.  
(March 2, 2004)

**Abstract:** The Agricultural Revolution in Western Asia, which took place some 11,000 years ago, was a turning point in human history [Childe, V. G. (1952) *New Light on the Most Ancient East* (Routledge & Kegan Paul, London)]. In investigating the cultural processes that could have led from gathering to intentional cultivation, various authors have discussed and tested wild cereal harvesting techniques. Some argue that Near Eastern foragers gathered grains by means of sickle harvesting, uprooting, plucking (hand stripping), or beating into baskets [Hillman, G. C. & Davies, M. S. (1999) in *Prehistory of Agriculture: New Experimental and Ethnographic Approaches*, ed. Anderson, P. (The Institute of Archaeology, University of California, Los Angeles), pp. 70–102]. During systematic experiments, we found that archaeobotanical data from regional Neolithic sites support ground collection of grains by early hunter-gatherers. Ground collecting suits the natural shattering of wild species that ripen and drop grains at the beginning of summer. We show that continual collection off the ground from May to October would have provided surplus grains for deliberate sowing in more desirable fields, and facilitate the transition to intentional cultivation. Because ground gathering enabled collectors to observe that fallen seeds are responsible for the growth of new plants in late fall, they became aware of the profitability of sowing their surplus seeds for next year's food. Ground collecting of wild barley and wild wheat may comprise the missing link between seed collecting by hunter-gatherers and cereal harvesting by early farmers.

2. Kislev, M.E., A. Hartmann and O. Bar-Yosef  
2006 Early Domesticated Fig in the Jordan Valley  
*Science* 312:1372-1374 . (2 JUNE 2006)

**Abstract:** It is generally accepted that the fig tree was domesticated in the Near East some 6500 years ago. Here we report the discovery of nine carbonized fig fruits and hundreds of drupelets stored in Gilgal I, an early Neolithic village, located in the Lower Jordan Valley, which dates to 11,400 to 11,200 years ago. We suggest that these edible fruits were gathered from parthenocarpic trees grown from intentionally planted branches. Hence, fig trees could have been the first domesticated plant of the Neolithic Revolution, which preceded cereal domestication by about a thousand years.

##### Genetic evidence for plant domestication

3. Badr, A., K. Muller, R. Schafer-Pregl, H. El Rabey, S. Effgen, H. H. Ibrahim, C. Pozzi, W. Rohde and F. Salamini  
2000 On the Origin and Domestication History of Barley (*Hordeum vulgare*)  
*Molecular Biology and Evolution* 17(4):499–510. 2000

**Abstract:** Remains of barley (*Hordeum vulgare*) grains found at archaeological sites in the Fertile Crescent indicate that about 10,000 years ago the crop was domesticated there from its wild relative *Hordeum spontaneum*. The domestication history of barley is revisited based on the assumptions that DNA markers

effectively measure genetic distances and that wild populations are genetically different and they have not undergone significant change since domestication. The monophyletic nature of barley domestication is demonstrated based on allelic frequencies at 400 AFLP polymorphic loci studied in 317 wild and 57 cultivated lines. The wild populations from Israel-Jordan are molecularly more similar than are any others to the cultivated gene pool. The results provided support for the hypothesis that the Israel-Jordan area is the region in which barley was brought into culture. Moreover, the diagnostic allele I of the homeobox gene *BKn-3*, rarely but almost exclusively found in Israel *H. spontaneum*, is pervasive in western landraces and modern cultivated varieties. In landraces from the Himalayas and India, the *BKn-3* allele IIIa prevails, indicating that an allelic substitution has taken place during the migration of barley from the Near East to South Asia. Thus, the Himalayas can be considered a region of domesticated barley diversification.

4. Heun, M., R. Schafer-Pregl, D. Klawan, R. Castagna, M. Accerbi, B. Borghi and F. Salamini  
1997 Site of Einkorn Wheat Domestication Identified by DNA Fingerprinting  
*Science* 278:1312-14 . (14 November 1997)

**Abstract:** The emergence of agriculture in the Near East also involved the domestication of einkorn wheat. Phylogenetic analysis that was based on the allelic frequency at 288 amplified fragment length polymorphism molecular marker loci indicates that a wild group of *Triticum monococcum boeoticum* lines from the Karacadag mountains (southeast Turkey) is the likely progenitor of cultivated einkorn varieties. Evidence from archeological excavations of early agricultural settlements nearby supports the conclusion that domestication of einkorn wheat began near the Karacadag mountains.

#### Early animal domestication and domesticates

5. Bar-Oz, G., T. Dayan, D. Kaufman and M. Weinstein-Evron  
2004 The Natufian economy at el-Wad Terrace with special reference to gazelle  
exploitation patterns *Journal of Archaeological Science* 31:217–231.

**Abstract:** We carried out a detailed taphonomic and zooarchaeological analysis of the faunal remains from the new excavation of the Late Natufian layers of el-Wad Terrace. We focused on gazelle exploitation patterns and examined them within the context of the established Epipalaeolithic sequence from the coastal plain of Israel. Mountain gazelle (*Gazella gazella*) is the most heavily exploited species. The taphonomic history of the assemblage suggests minor loss of bones caused by post-depositional processes and indicates that bone destruction occurred during occupation. Cut marks from all stages of activities, absence of selective transport, and body part representation suggest that gazelle were butchered at the site. Analysis of gazelle sex composition shows male overrepresentation during the Natufian. Size trends show an increase of gazelle body-size during the Natufian in comparison to previous periods. The patterns of body-size increase show the same tendency in proximal and distal limb-bones. The trends in gazelle body-size from the Epipalaeolithic of the coastal plain do not demonstrate any sign of morphological dwarfism, increased variation, or allometric changes in the morphology of Natufian gazelles and thus do not support the previously suggested hypothesis of "proto-domestication".

6. Zeder, Melinda A. and B. Hesse  
2000 The Initial Domestication of Goats (*Capra hircus*) in the Zagros Mountains  
10,000 Years Ago. *Science* 287:2254-57 (24 March 2000)

**Abstract:** Initial goat domestication is documented in the highlands of western Iran at 10,000 calibrated calendar years ago. Metrical analyses of patterns of sexual dimorphism in modern wild goat skeletons (*Capra hircus aegagrus*) allow sex specific age curves to be computed for archaeofaunal assemblages. A distinct shift to selective harvesting of subadult males marks initial human management and the transition from hunting to herding of the species. Direct accelerator mass spectrometry radiocarbon dates on skeletal elements provide a tight temporal context for the transition.

### Genetic evidence for the origins of goats

Luikart, G., L. Gielly, L. Excoffier, J-D. Vigne, J. Bouvet and P. Taberlet

2001 Multiple maternal origins and weak phylogeographic structure in domestic goats  
*Proceedings of the National Academy of Sciences USA* 98(10): 5927–5932  
(May 8, 2001)

Abstract: Domestic animals have played a key role in human history. Despite their importance, however, the origins of most domestic species remain poorly understood. We assessed the phylogenetic history and population structure of domestic goats by sequencing a hypervariable segment (481 bp) of the mtDNA control region from 406 goats representing 88 breeds distributed across the Old World. Phylogeographic analysis revealed three highly divergent goat lineages (estimated divergence >200,000 years ago), with one lineage occurring only in eastern and southern Asia. A remarkably similar pattern exists in cattle, sheep, and pigs. These results, combined with recent archaeological findings, suggest that goats and other farm animals have multiple maternal origins with a possible center of origin in Asia, as well as in the Fertile Crescent. The pattern of goat mtDNA diversity suggests that all three lineages have undergone population expansions, but that the expansion was relatively recent for two of the lineages (including the Asian lineage). Goat populations are surprisingly less genetically structured than cattle populations. In goats only 10% of the mtDNA variation is partitioned among continents. In cattle the amount is >50%. This weak structuring suggests extensive intercontinental transportation of goats and has intriguing implications about the importance of goats in historical human migrations and commerce.