EMMER WHEAT
AN EVOLVING MODEL OF UNDERUTILIZED SPECIES,
FROM THE ON FARM CONSERVATION
TO THE MARKET DEVELOPMENT

Oriana Porfiri

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What is “FARRO”

Farro = common Italian name to indicate hulled wheats (cereal species)

With 3 species genetically closed to naked wheat species (modern species = durum wheat and common wheat) with they have phylogenetic relationship.

- *Triticum monococcum* (diploid species = 2n = 2x = 14) = El NKORN
*Triticum monococcum* spp. *monococcum*
Einkorn (cultivated form)
DIPLOID (AA genome)
Hulled kernel, no shattering ear
(non-brittle rachis)

*Triticum monococcum* spp. *boeoticum*
Wild einkorn
DIPLOID (AA genome donor)
Hulled kernel, brittle rachis
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- *Triticum monococcum* (diploid species = 2n = 2x = 14) = EINKORN
- *Triticum dicoccum* (tetraploid species = 2n = 4x = 28) = EMMER
**Triticum turgidum spp. dicocoides**

Wild emmer, wild relative of tetraploid cultivated wheats  
AABB genome

**Triticum turgidum spp. durum**

Tetraploide (AABB)  
Cultivated durum wheat, no-brittle rachis, naked kernel
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- *Triticum dicoccon* (tetraploid species = 2n = 4x = 28) = EMMER
- *Triticum spelta* (hexaploid species = 2n = 6x = 42) = SPELT
**Triticum aestivum spp. spelta**

Hexaploid (AABBDD) - Cultivated spelt, non-brittle rachis, hulled kernel

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**Triticum aestivum spp. vulgare**

AABBDD genome

Common wheat (cultivated form), non-brittle rachis, naked kernel
In Italy the “farro” is mainly represented by **EMMER** (*T. dicoccum*) because of:

- wide diffusion in all Mediterranean basin
- the cultivation probably is not never stopped during centuries
- many local varieties are remained until now and some of they are still cultivated
GARFAGNANA
(mountain area in the Toscana Region)

VALNERINA
(mountain area in the central Appennines)

Some of the Italian local varieties of emmer
Why “farro” is a minor/underutilized species

Similar reasons of other species

- Limited cultivation in the modern agricultures
  - hulled kernel (after harvest the de-hulling process is need)
  - old species, replaced by modern species and new varieties (coming from specific breeding programs) more suitable to modern agricultural systems

- Limited uses in the modern food and cooking
  - because of old food, frequently closed to traditions and local knowledge
  - long time to cook (with the traditional products)
  - low appeal of emmer products (as tritello, integral grains, …) to the consumers
The reasons of recovered of emmer

a) GENETIC ASPECTS
• Genetic resources safeguard
• Genotype with wide genetic basis (source of genes, wide adaptability)
• Crucial position on relationship between different species of *Triticum* (phylogenesis, domestication)

b) AGRONOMIC ASPECTS
• Crop suitable to marginal lands, to low-input or organic agricultural systems
• Low, but constant, production in the space and in the time
• Alternative crop (according to UE agricultural policy)
c) FOOD and NUTRIONAL CHARACTERISTICS

• Modern processing technologies are able to obtain various differentiated final products (with wider appeal to consumers then traditional uses)
• Interesting nutritional (health-food) aspects [amount and type of gluten content (ratio between glutenins and gliadins), aleuron layer, fiber content, ....]
Traditional uses

Hulled grains Whole (integral) kernels
Traditional uses
“tritello”
Traditional uses
New uses

“blowing” kernel
A natural passion for emmer
NEW USES

Toasted and broken grains (to make a drink like coffee)
NEW USES

Sweets and bakeries products
The reasons of recovered of emmer

d) Strong links with local uses, traditions and knowledge

e) Genetic materials = mainly landraces
  - On-farm conservation example
  - Connected to old farmers who have been and still are
    - rigorous keepers of seeds and plants
    - precious source of historical memory
Renato is an old farmer of the Appennines area of central Italy who safeguard, from many generations of his family, a local variety of emmer named “Farro di Monteleone di Spoleto”
The elderly people are a precious source of historical information, impossible to find in written form.
So, “farro” is an excellent model for other underutilized species.....

... but!
... but,
the consequences of emmer recovery

1. A cultivation increasing (to satisfy market requests)
   - in traditional areas (with introduction of no local landraces or new genotypes)
   - in new areas with landraces from abroad or with new genotypes

2. Disequilibrium of demand/offer balance on the market

3. High risk of genetic erosion
   - landraces disappearance
   - genetic “pollution” with other genotypes (loss of variety identity)
“Farro” model shows both positive and negative traits
The positive traits = TO FOLLOW

- it’s possible to recover, characterize and exploit a minor species including local varieties
- the modern transformation technologies give numerous and different final products (able to satisfy different consumer’s request) = add value
- interesting genetic and nutritional value
- interesting agronomic value (particularly on low input and organic cultivation systems)
- strong links with local rural communities, with local knowledge and traditions
The negative traits = TO AVOID

- increasing too much market outside the niche
- un-balanced market
  - lack on the chain production organization
  - lack of linkage between producers (farmers) and consumers
- introduction of abroad genetic materials in the autochthonous area of landraces (which is a cause of genetic erosion)
- expansion of cultivation in new areas = decrease weight of economy of traditional areas (with many social consequence, particularly in the marginal lands)
Which the best strategy?

THE ADEQUATE ORGANIZATION OF CHAIN PRODUCTION
a. Competence and capacities of each actor of the chain production

a1. Farmers

- Cultivation in traditional areas
- Cultivation of landraces (when they exist)
- Differentiated cultivation and processing systems
- Cultivation under agreement with transformers
a. Competence and capacities of each actor of the chain production

a2. Transformers/processors

- Grant a privilege to local production (particularly local varieties when they exist)
- Highlight links of products with territory and its history
- Promote cultivation under agreement with farmers with adequate technical/agronomic assistance
Which way?

a. Competence and capacities of each actor of the chain production

a3. Market

- Avoid disequilibrium of demand/offer of production
- Promote exploitation of local production to achieve an adequate add value of final products
- Safeguard and characterize (differentiation) local market in confront of global market
Which way?

a. Competence and capacities of each actor of the chain production

a4. Scientific institutions and agricultural extension services
   - Applied research
     - Safeguarding genetic resources
     - Safeguarding farmer identity and local knowledge
   - Technical assistance to farmers

a5. Local institutions
   - Information
   - Support on respect of production disciplinary
b. Promotion of association form between farmers (co-operatives, consortium and so on)

- Safeguarding farmer role
- Organization of chain production
- Checking chain production
Thanks for your attention