

2020 Annual Meeting of KoSFoST  
Korean Fermented Food Symposium  
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# The origin of fermentation Culture in Northeast Asia and Korean Fermented Foods

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# 동북아 발효문화의 기원에 관한 고찰



## ❖ 한국 음식문화사 연구의 한계

- 일본이나 한자문명의 기록에 의존
- 식민사관의 잔존
- 역사시대 이전의 고고학 자료 연구의 필요성

## 한국 고고학 연구의 성과

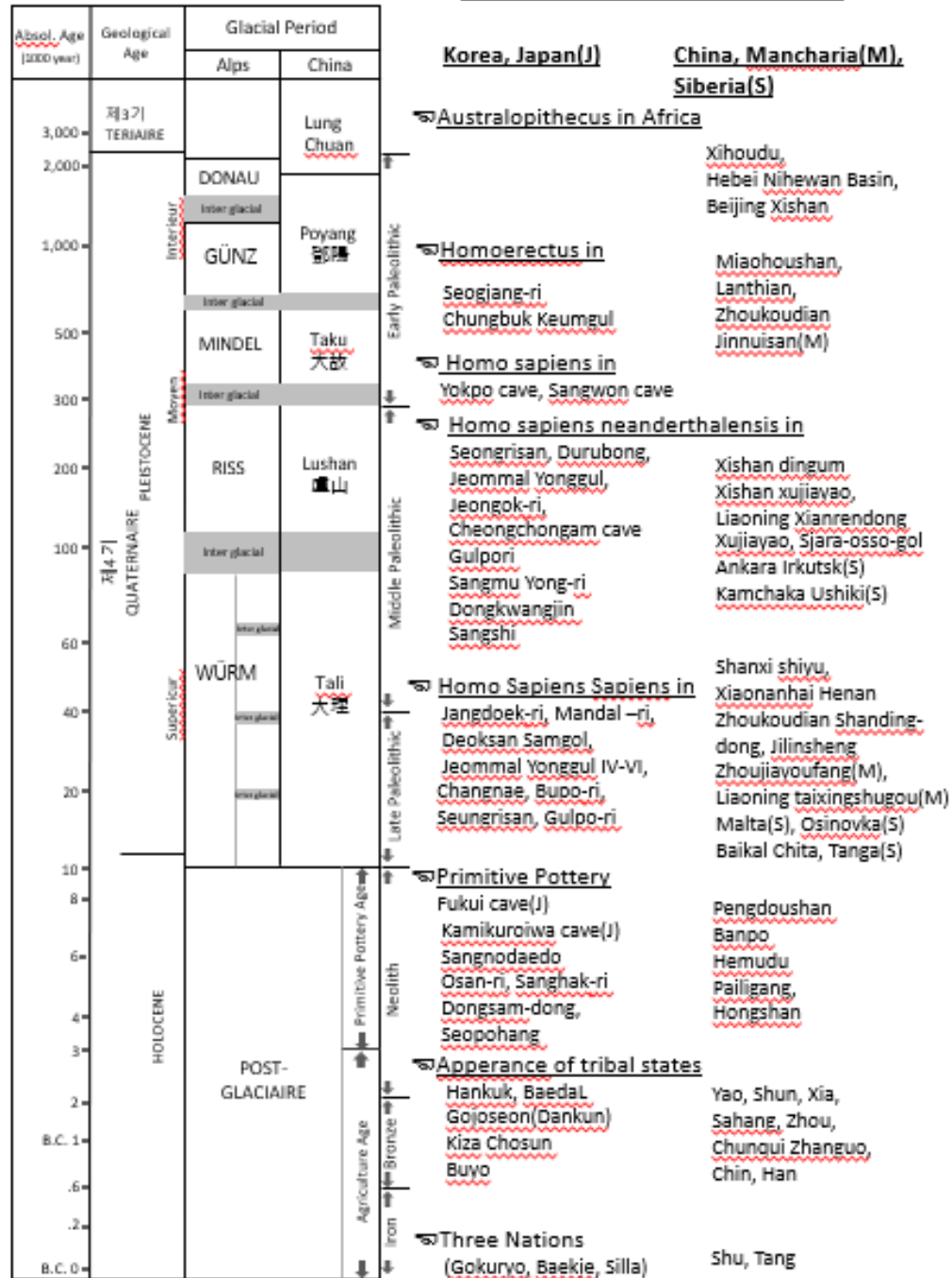
- 1960년대부터 시작
- 한민족의 역사를 전기구석기 시대로 확장

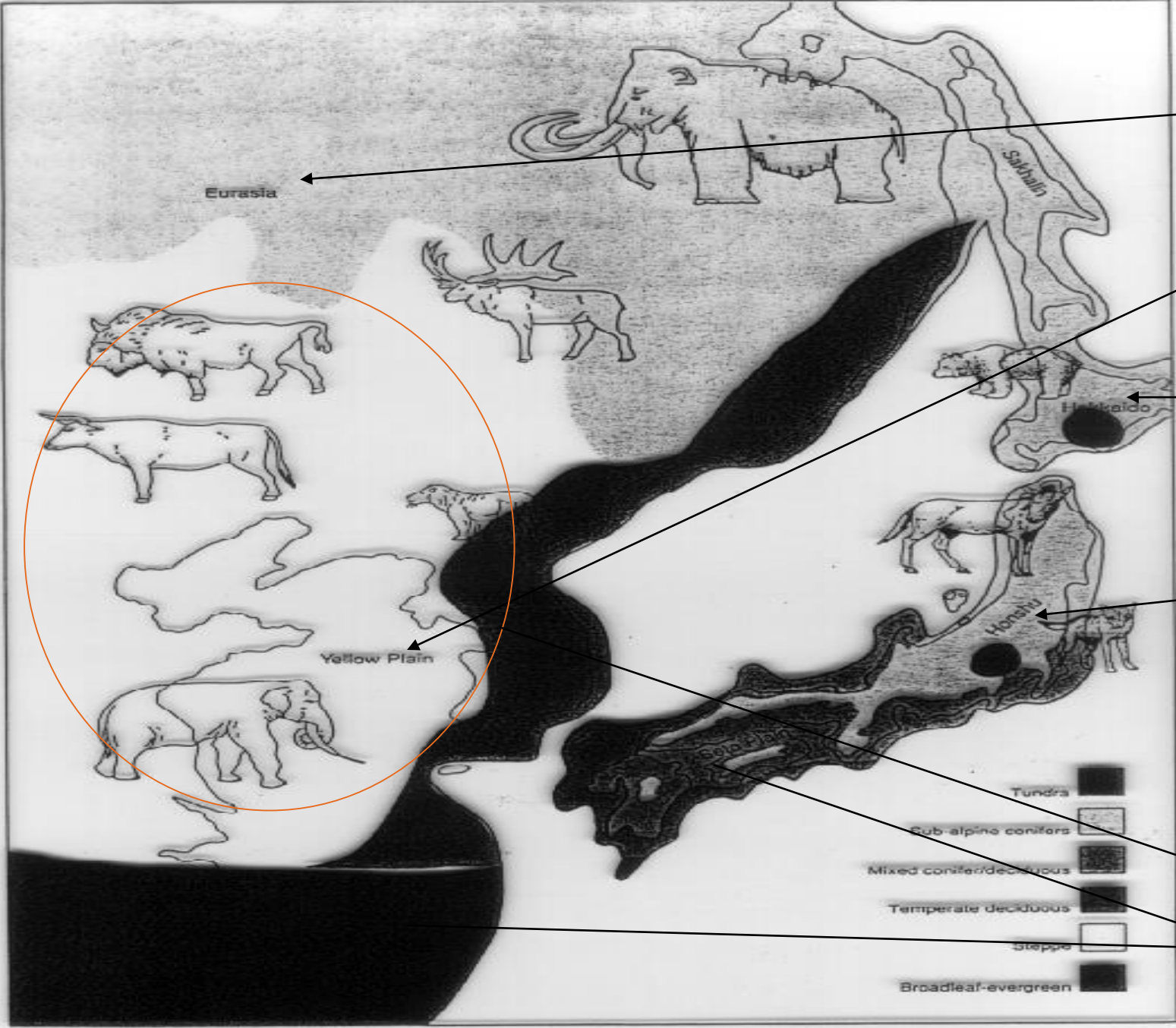
## 본 연구의 목적

- 음식문화사를 통해 한민족의 잃어버린 천년의 역사를 복원

# 지구의 지질연대와 동북아 선사문화

## Prehistoric Culture in Northeast Asia





**Eurasia**

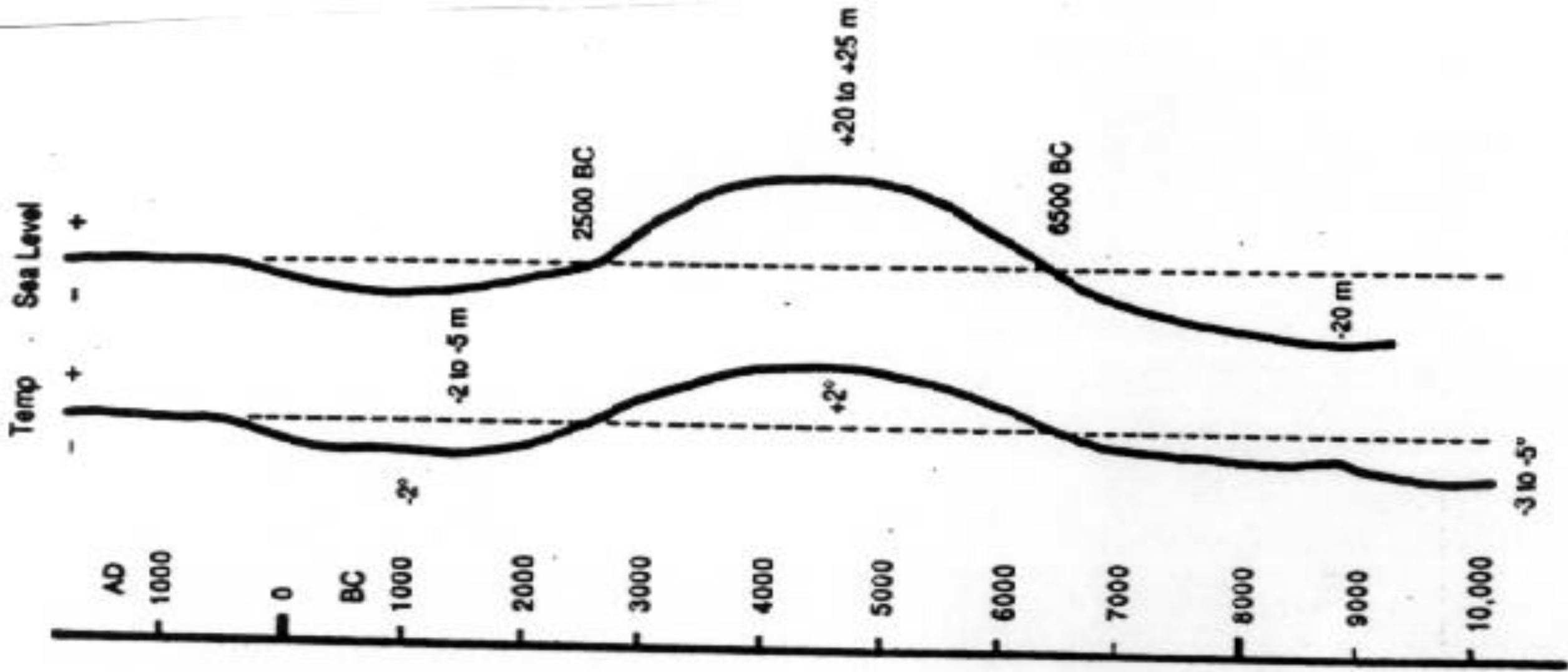
**Yellow Plain**

**Honshu**

**Steppe**

**Broadleaf-evergreen**

***Geography of Northeast Asia in 16,000 B.P.(Wulum IV Glacier) (Barnes, 1993)***



**Fig 2. Average temperature and sea level of the globe during the alluvial epoch (Barnes, 1993)**



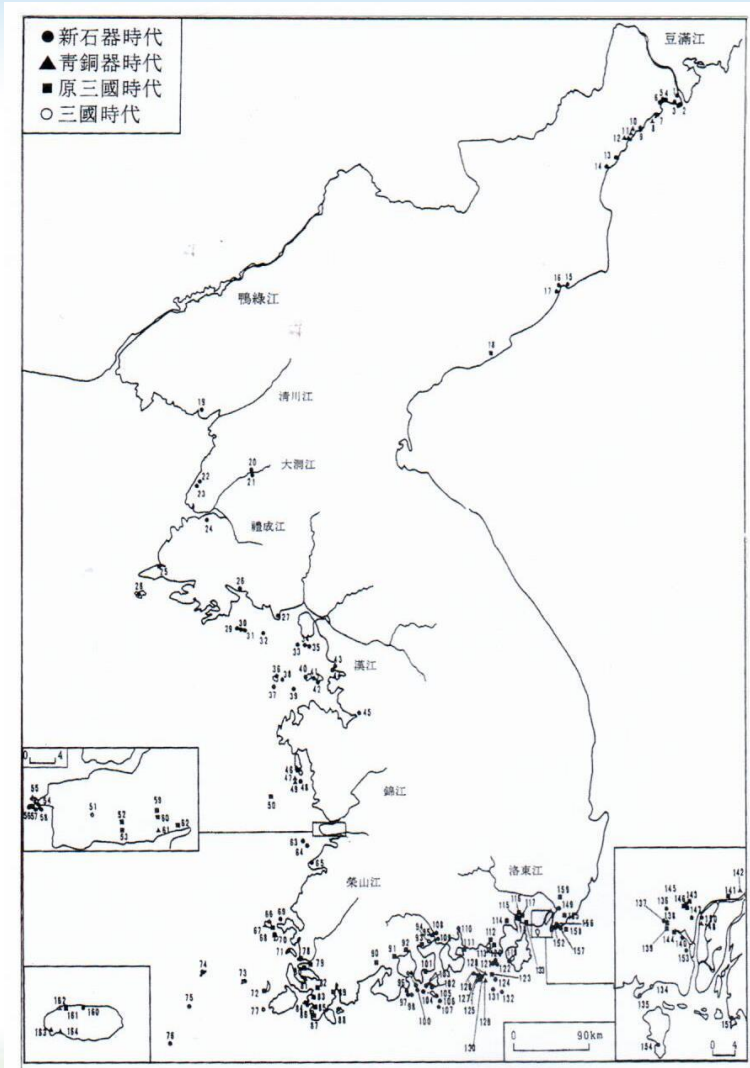
# Chronology of Prehistoric Era of Korean Peninsula and Northeast Asia

- ❖ **700,000-300,000BP**    **Early Paleolithic Age**
- **300,000-40,000 BP**    **Middle Paleolithic Age**
- **40,000-10,000 BP**    **Late Paleolithic Age**
- **BC 8,000 - 3,000**    **Primitive Pottery Age, Shell mounds**
- **BC 3,000 - 1,500**    **Neolithic Age, Agricultural stone tools**
- **BC 1,500 - 500**    **Bronze Age, Megalithic Dolmens**
- **BC 500**    **Iron Age**



(Shell mounds)

# 원시토기의 유적지 – 패총(Shell Mound)



한반도에서 발견된 조개무덤 164개소  
동북지방 18개소  
서북지방 9개소  
서해안 중부지방 38개소  
남해안지방 99개소



한반도의 패총 분포도(김건수, 1999)  
(한국 원시 고대의 어로문화)

(부산시 동삼동패총)



한반도와 동북아시아의 구석기시대  
식생활 환경

이철호

民族文化研究 第31號 / 1998. 12.

高麗大學校  
民族文化研究院

■ 민족문화연구 제32호(1999)

동북아시아 원시토기문화시대의 특징과  
식품사적 중요성

이철호

고려대학교 민족문화연구원



# 원시토기의 발생에 대한 기술사적 고찰

## Techno-historical consideration of Primitive earthenware



- ❖ Environmental factors of pottery making
- ❖ Technological developments related to usage of pottery
- ❖ Shape and usage of pottery

# 대한해협 연안이 원시토기의 발상지가 된 지정학적 근거

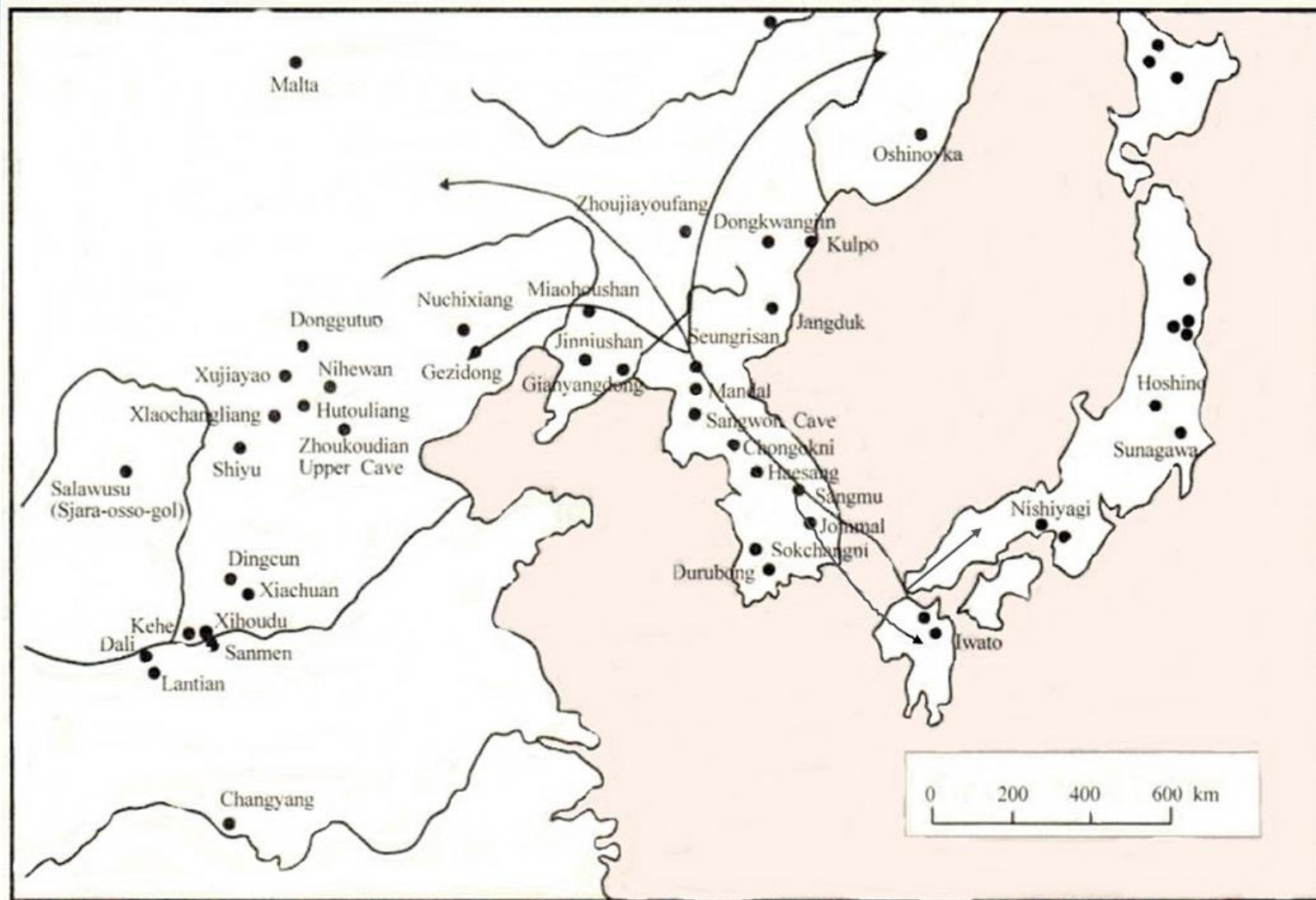
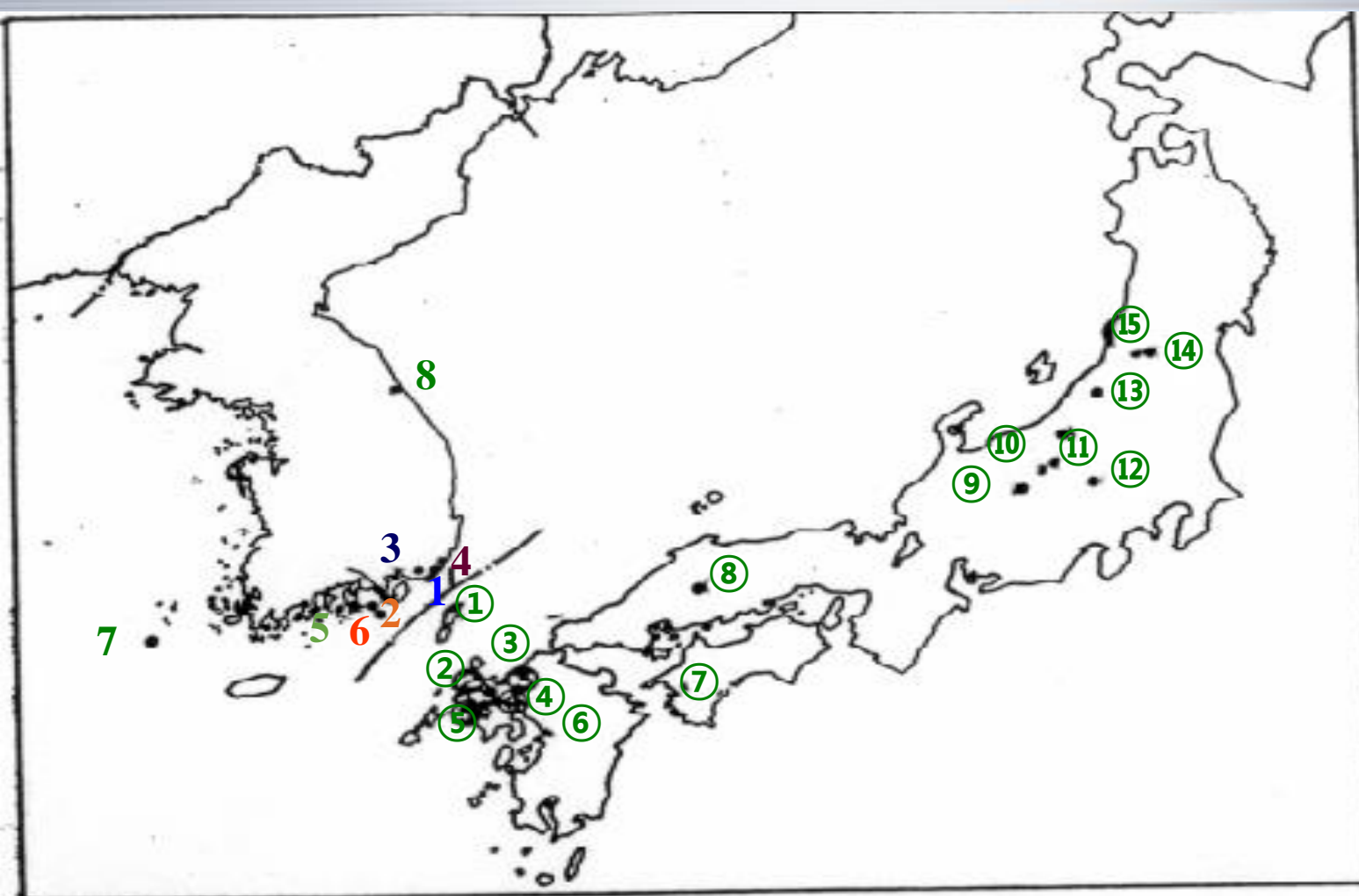


Fig. 1. Paleolithic Sites in Northeast Asia and Migration Routes of Paleolithic Peoples (Lee, 2001, Redrawn by Lee, 2018 )



<Korea Strait> 1. **Dongsamdong** 2. **Dadaepo** 3. **Chukgok** 4. **Sinamri** 5. **Sangnodaedo**  
6. **Yokjido** 7. **Sohuksando** 8. **Osanri**

<Japanese Archipelago> ① **Kosijima** ② **Fukui** ③ **Nisikaratsu** ④ **Iwasita** ⑤ **Senpukuji**  
⑥ **Todoroki** ⑦ **Kamikuroiwa** ⑧ **Mawatari** ⑨ **Yangimata** ⑩ **Isigoya** ⑪ **Hasitate** ⑫ **Tazawa**  
⑬ **Ozawa**

*Fig 1. Primitive Pottery Age remains excavated in Korea Strait Region*

# 한반도와 동북아시아 구석기 토기문화 유적지 출현 연대

Table 1-1. The estimated ages of primitive pottery remains of Paleolithic era in Korean Peninsula and Northeast Asia (Lee, 1999)



Century	Korean Peninsula southeastern coast Korea Strait coast 대한해협연안	Korean Peninsula northwestern region Liaotung, Manchuria 한반도 서북 요동, 만주	Korean Peninsula northeastern region Maritime Province of Siberia 한반도 동북 연해주	Korean Peninsula Midwest region 한반도 중부	China Mainland 중국
B.C.10000	Kyushu Hukui Cave Shigoku Kamikuroiwa Cave				
B.C. 8000	Japanese Island(早水?) Sangnodaedo Xth layer				Pendoushan in Yangzi
B.C. 6000	Dongsamdong Jodogi Sangnodaedo 1st culture, Osanri B, Japanese Island)	Manchuria Shiniuishan lower layer, Northwest Korea lower layer, Chonghori	Sopohang 1st		Peiligang Dadiwan
B.C. 5000	Dongsamdong Mokdogi, Sangnodaedo 2nd culture, Osanri lower layer, Japanese Island	Ssanghakri Tosongri	Sopohang 1st	Amsadong, Jitapri 1, dwelling site	Bampo Xinglongwa Bexin Hemudu Majiabang
B.C. 4000	Dongsamdong Pusangi Sangnodaedo 3rd culture, Osanri middle-upper layers. Sugari 1st layer Japanese Island Mori	Manchuria Shiniuishan Mid layer, Dongsan lower layer, Ogachon	Seopohang 3rd	Misari, Keumtanri, Namkyung 1st era	Miadigou Hongshan Dawenkou Daxi
B.C. 3000	Dongsamdong Dudo Sugari 2nd layer, Japanese Island	Manchuria Shinnuishan lower layer, Dangsang upper layer, Ssangtaja 1st era, Shinamri 1st era	Seopohang 4th	Sunyudo, Namkyung 2nd era	Majiayao Banshan Qujialing Liangzhu
B.C. 2000	Dongsamdong Youngdogi, Sangnodaedo 4th culture, Sugari 3rd layer, Japanese Island	Sinamri 2nd layer Sangmasok A	Seopohang 5th	Sobudo, Joido, Shido	Quijia, Longshan L.Xiajiadian Qinglongquan Yueshi

# 상노대도 유적지 발굴 토기의 연대별 제작방식 및 특색

Table 2-3. Chronology and manufacturing characteristics of potteries excavated from Sangnodaedo remains (Lee, 1999)



Layer name (estimated year)	Main ingredient/ Bizim(additive)	Molding technique	Finishing technique	Baking temperature	Water absorbency	Color/wall thickness	Shape/rim-diameter
X layer, before 6000 B.C.	Traces of pottery small debris						
IX layer, before 6000 B.C.	clay, ferrous salt clay/quartz, granite, pottery powder(70/30)	Sunal Kwonsang Dough width 1-3cm	Wall rubbing, Painting thick layer, white/ red dye	below 700°C	9.5-25.3%	brown/7-8mm	no pattern, attached strips, round-bottom, flat-bottom, big vessel, half-egg bowls/12-38cm
VIII layer, 6000 B.C	ferrous salt clay, rock powder/. pottery powder, quartz(55/45)	Kwonsang Dough width 3-3.5cm	Painting thick layer, inner wall rubbing	below 700oC	9.7-17%	light brown/ 4-12mm	round-bottom,, small bowl/ 18-34cm
VII layer, Before 6-5000 B.C.	ferrous salt clay, rock powder/ quartz, feldspar, pottery powder (55/45)	Kwonsang	Painting thick layer	below 700°C	10-16.8%	brown, grey/ 7-8mm	attached strip, no pattern, round-bottom, large vessel/ 14-38cm
V layer, 4000 B.C.	ferrous salt clay, rock powder / quartz, pottery powder, clamshell powder, biotite	Kwonsang Yonjok	Painting thin layer, no painting	near 700°C	5.2-17.2%	brown, grey/ 5-6mm	fish bone pattern, comb, dot, scale pattern, round bottom, flat bottom, large vessel, crocks, trays/6-42cm
I IV ayer, 3000 B.C	sandy soil/ clamshell powder, pottery powder, mica	Kwonsang Yonjok	inner wall rubbing, painting thick layer	700-750°C	6.2-15.1%	black- brown, grey-brown/6mm	slash, wave pattern, comb pattern, inclined lips, double lips, round-bottom, big vessel/12-42cm
III layer, 2000 B.C	sandy soil/ clamshell powder, quartz	Kwonsang Yonjok	wall rubbing Double lips	700-750°C	7.2-16.9%	brown, grey, black/6mm	clomb, dot, wave pattern, round-bottom, flat-bottom, sharp-bottom vessel single lip/14-40cm double lip/26-48cm

## 대한해협연안 원시토기의 기술적 발전 방향



### Direction of technological progress of primitive pottery in Korea Strait Region

- ❖ Harder
- ❖ Lower water absorbency
- ❖ Durable on fire
- ❖ Bigger



# 토기의 형태와 용도에 따른 분류



## Classification according to the usage



### ❖ Cooking pot (뚝배기) :

- Bowl (mouth diameter 6-12 cm, 12 - 24cm)
- low absorbency, conic or round bottom



### ○ Fermentation crock (항아리) :

- middle size jar(4-17 liter)
- low absorbency, conic or round bottom



### ○ Storage jar (독) :

- large size jar (17-56 liter)
- high absorbency, round/flat bottom

# Food culture related with pottery use



## ❖ Cooking vessel

- Boiling with sea water
- Finding of salt, salty taste
- Cooking with sea food, vegetables, meat, and seeds
- *Chigae* culture

## ○ Storage jar

- Storage of wet foods
- Putrefaction / fermentation
- Fermentation technology





# Origin of fermentation technology



- ❖ *Nuruk*  
(alcoholic fermentation starter)
- ❖ *Kimchi* fermentation
- ❖ *Jeotkal* fermentation

# Beginning of *Nuruk* making and alcoholic fermentation of cereals

누룩제조와 곡물 양조기술의 시작



- Storage of seeds, grains, roots and nuts in earthen jar



- Mold growth by warm & humid climate



- Raw starch hydrolysis by amylase from *Rhizopus* sp.



- With water, alcoholic fermentation by yeasts



- Uncooked alcoholic fermentation



- Spontaneous natural process





## **Kimchi fermentation** 김치발효기술의 기원



**Vegetables in sea water in a croak**

- **Lactic acid production by *Leuconostoc mesenteroides* (pH 4.5)**



- **Suppression of pathogens and spoilage microorganisms**



- ***Lactobacillus* growth (pH 3.0)**



# Fish fermentation

## 젓갈, 식해 발효기술의 기원

### ❖ Fish mixed with lactic acid fermented vegetables

↓  
○ Addition of sour fruits

↓  
○ Enzymic digestion of fish

↓  
○ Stink/strong smell with low salt

↓  
○ Increase of salt content to improve  
the flavor



# Origin of Fermented Soybean Foods

## 콩 발효 기술의 기원



- ❖ Primitive Pottery and Fermentation Technology in Korea Strait Region (6000 BC)
- ❖ Arrival of Northern Nomads and the **Need for Protein Source**
- ❖ **Invention of Soybean Use for Food** by Boiling Technology (ca. 2000 BC)
- ❖ **Invention of Soybean Fermentation** by Adopting Cereal Fermentation Technology already developed in the Primitive Pottery Era
- ❖ Fermented **Soybean Paste and Soybean Sauce** Making (Before 200 BC.)
- ❖ Marinating Meat with Soysauce – **Bulgogi** (Roasted Beef of Korea)

# 동북아시아 장류 발효식품의 종류와 전파경로

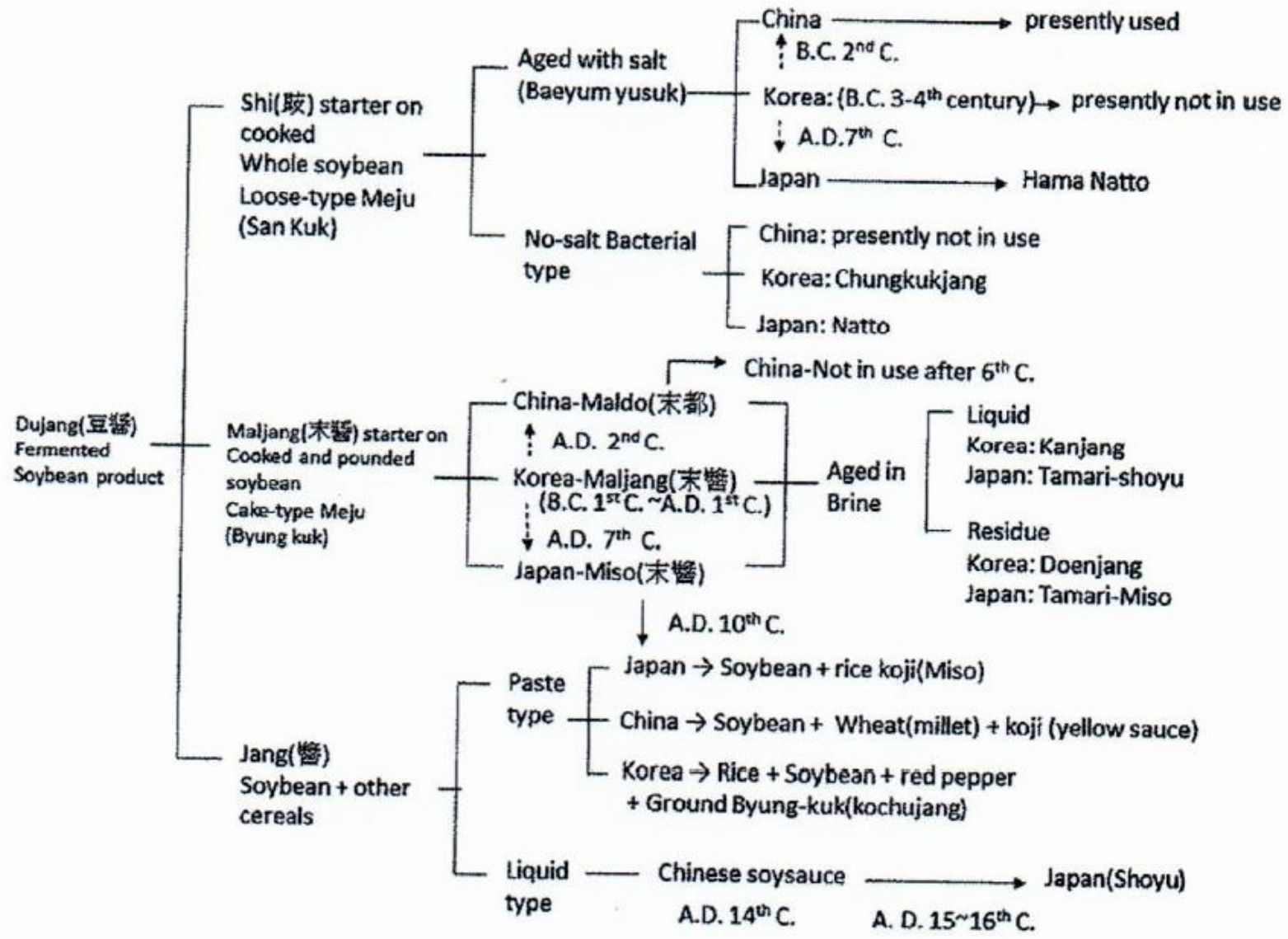


Fig. 1.1 The origin and interchange of Dujang (fermented soybean products) in East Asia (Lee 1990, 2009)



# Early records on fermented foods

## 중국의 고문헌에 기술된 발효식품

### ❖ Shijing (詩經, B.C. 1000) – rice wine

- Thousand wines in Yao (堯酒千種)
- King Woo's daughter : Goddess of rice wine



### ❖ Juolii (周禮, B.C. 200)

- Jang, Chi (醬, 豉)
- fermented meat/fish



# 고문헌에 기술된 동이족 (東夷族)



❖ 夷 -- 大(큰 대) 弓(활 궁) 人(사람 인)

- 큰 활을 쓰는 사람 (說文 AD100)

❖ 동이족 - 동방의 큰 활을 쓰는 민족

**Eastern Archers Tribes**



## 동북아 국가형성기(BC3000)의 엘리트 그룹으로 성장

후한서(後漢書) 총론 서문 - “예기(禮記) 왕제편에서 말하기를 동방을 가리켜 이(夷)라 하는데 뿌리를 뜻하며 성품이 어질어서 살리기를 좋아하고, 만물이 땅에서 뿌리를 박고 태어나며, 천성이 유순하여 도(道)로서 다스리며, 마침내 군자불사(신선)의 나라가 되었다. 그래서 공자도 논어에서 구이(九夷)땅에 가서 살고 싶다고 하였다.”



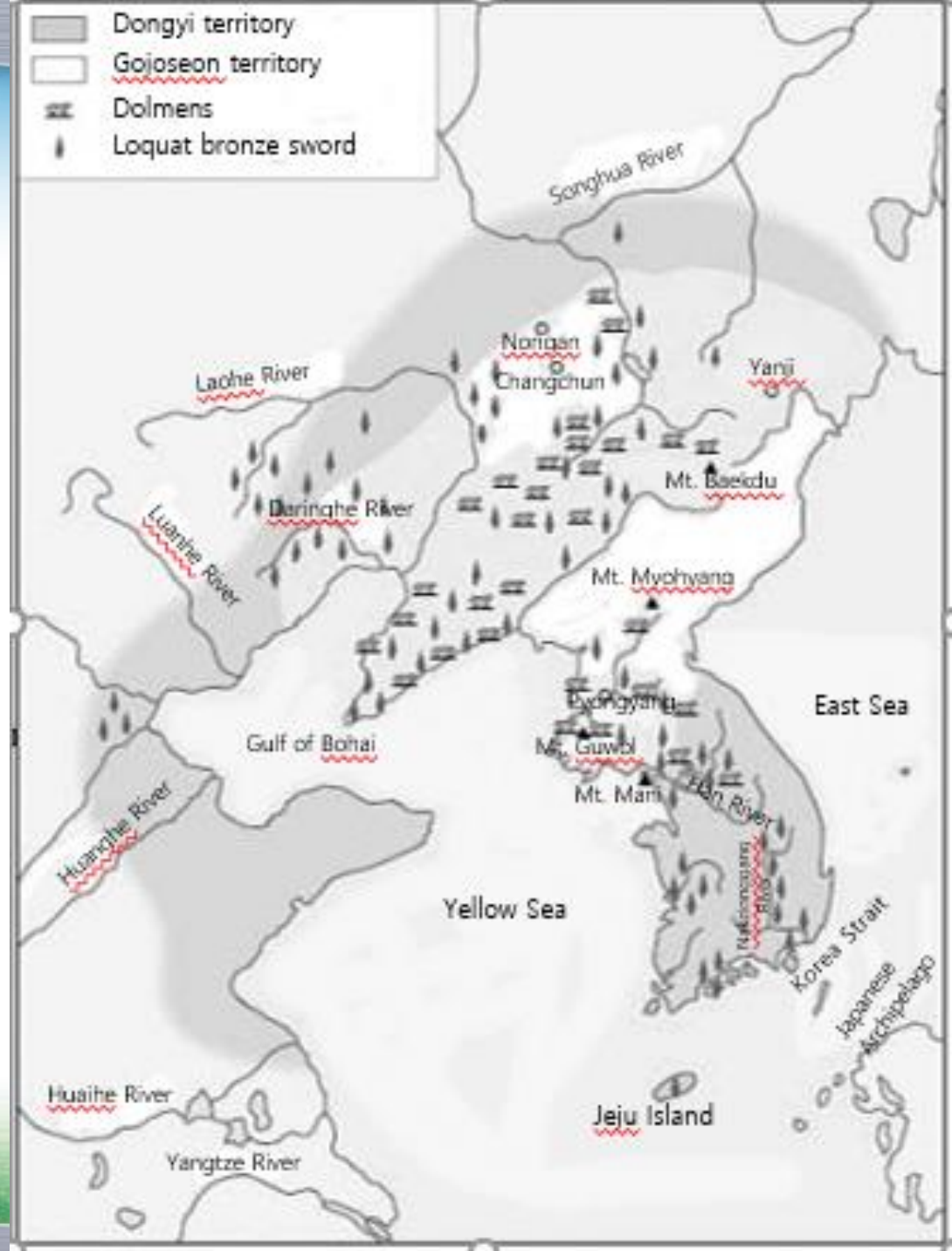
# 동이족의 분포지역

고조선 문명

고인돌 - 거석문화



비파형 동검



# Social developments during Primitive Pottery Age

## 원시토기문화시대의 영양인류학적 의의



### ❖ Improvement of food storage technology

- Fermentation

### ❖ Improvement of nutrition and food hygiene

- *Chigae* culture

### ❖ Population increase

### ❖ Formation of tribal states (BC. 3-4000)

### ❖ Megalithic culture, Eastern Archers tribe (*Dong Yi*)



**Transfer fermentation technology to neighboring countries including Japan (AD. 3-4)**

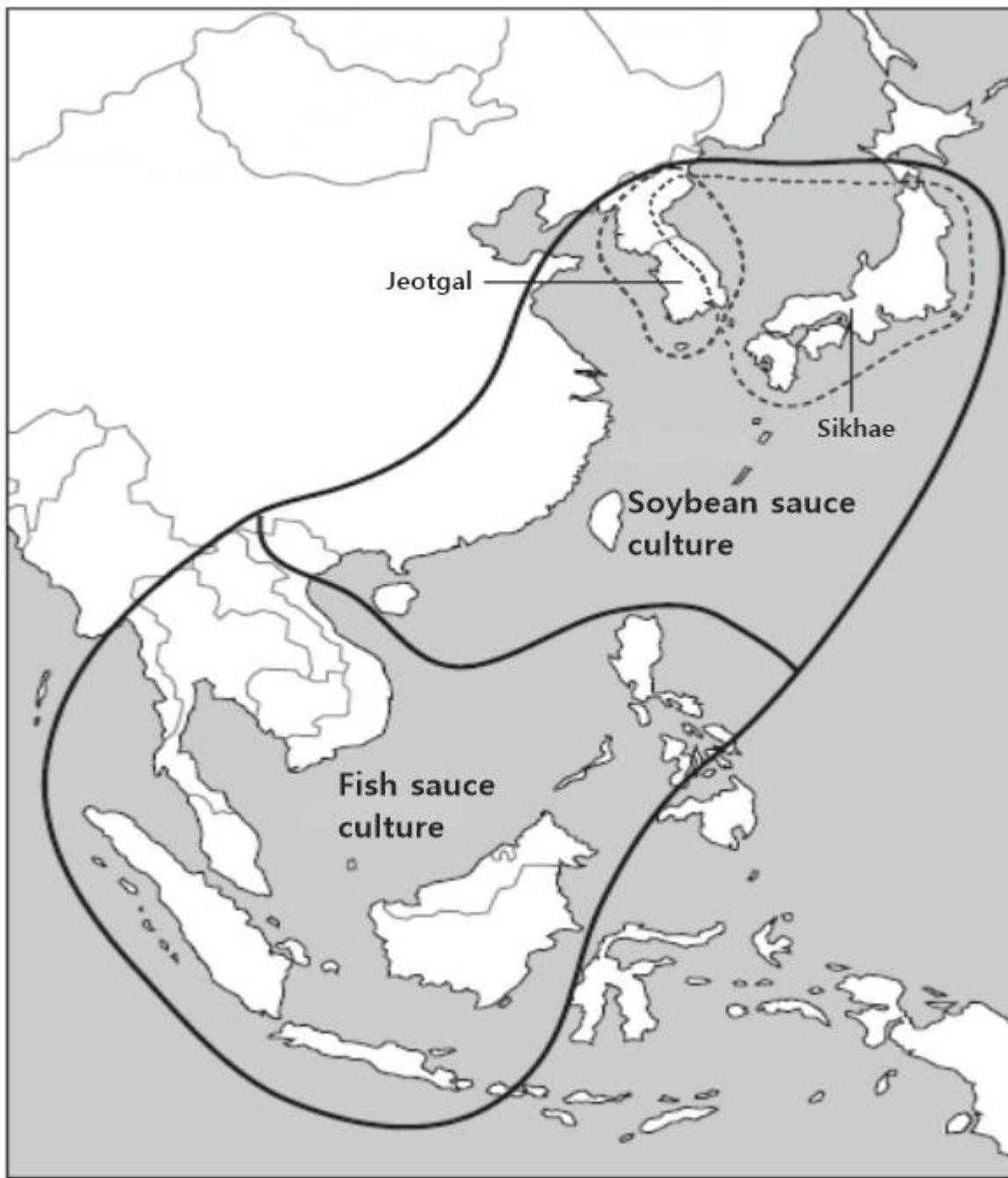


## 동아시아 조미식품문화 구분

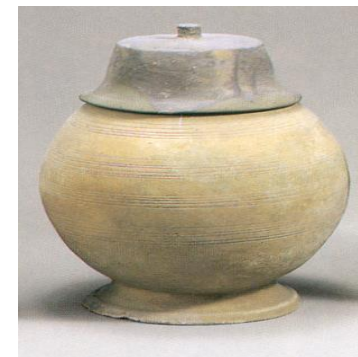
한반도의 발효문화는 어장문화와  
두장문화 모두를 포함

동아시아 발효문화 기원지의 모습을  
보이고 있음

Division of Seasoned Food Culture in East Asia  
(Ishige 1993, Modified by C. H. Lee 2017)



# Primitive Pottery Age in Korean Peninsula 한반도의 원시토기문화시대



BC 10,000

3,000

1,500

500

AD

**Paleolithic  
Age**

**Primitive  
Pottery Age**

**Neolithic  
Age**

**Bronze  
Age**

**Iron  
Age**

***Chigae* culture**

**Agriculture**  
**Soybean**  
**fermentation**

**Historic era**

**Fermentation of cereal,**  
**Vegetables & fish**

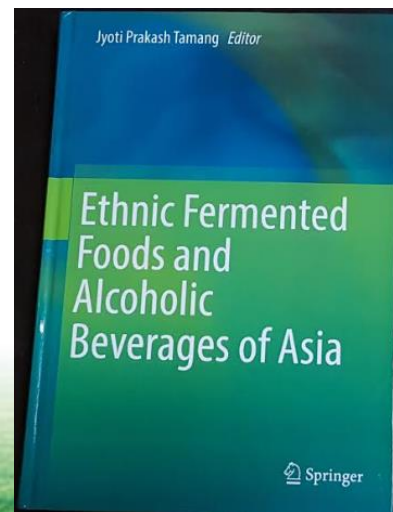
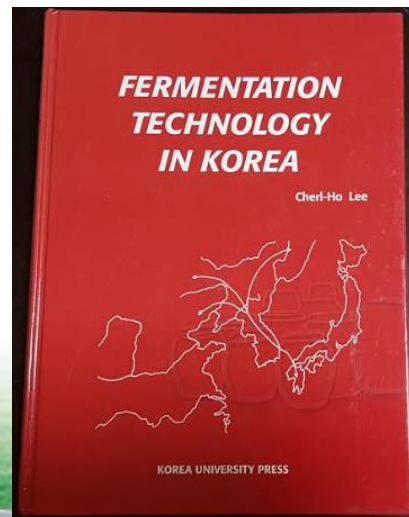
**Chinese**  
**literature**

**Korean**  
**literature**

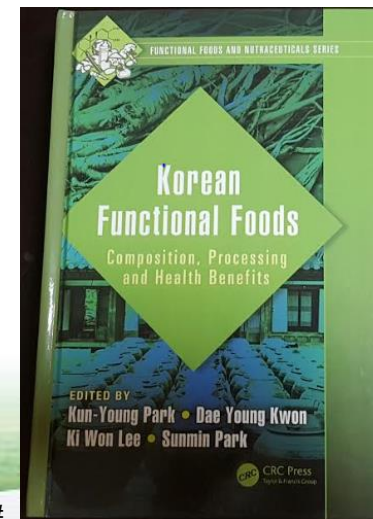


# References

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- ❖ Lee, C. H. and M. L. Kim. 2016. History of fermented foods in Northeast Asia. In *Ethnic Fermented Foods and Alcoholic Beverages of Asia* (Ed.: J.P. Tamang). New Delhi: Springer, 1-16
- ❖ Lee, C.H., 2018, Korean Foods- History, Culture and Characteristics, p.1-21. in *Korean Functional Foods, Composition, Processing and Health Benefits*, Ed. K.Y. Park, D.Y. Kwon, K.W. Lee and S. Park, CRC Press
- ❖ 이철호, 2017, 한국음식의 역사, 한국과학기술한림원 '석학, 과학기술을 말하다' 시리즈 29, 자유아카데미



Sample #



2020 Annual Meeting of KoSFoST  
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**경청해 주셔서 감사합니다.**