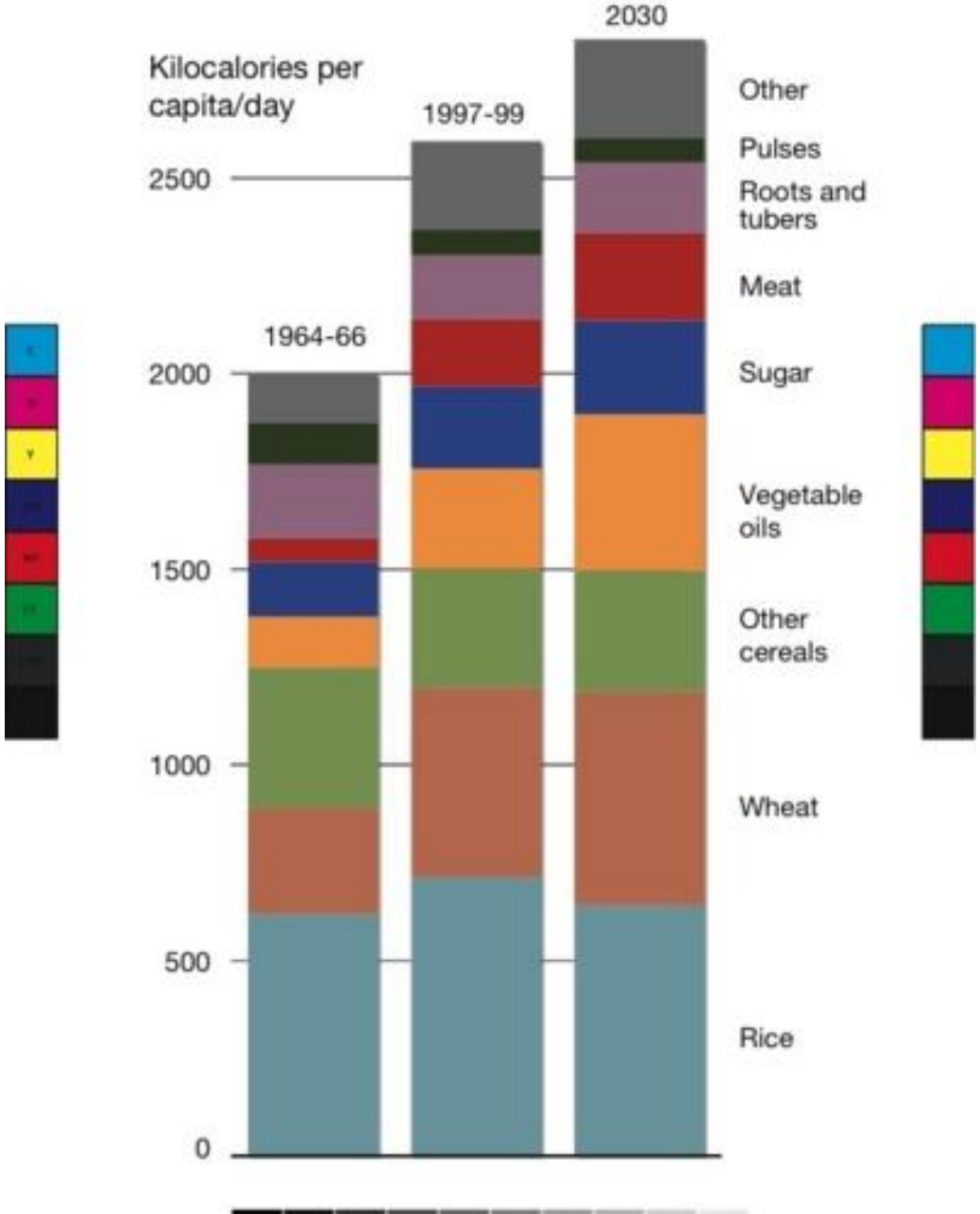
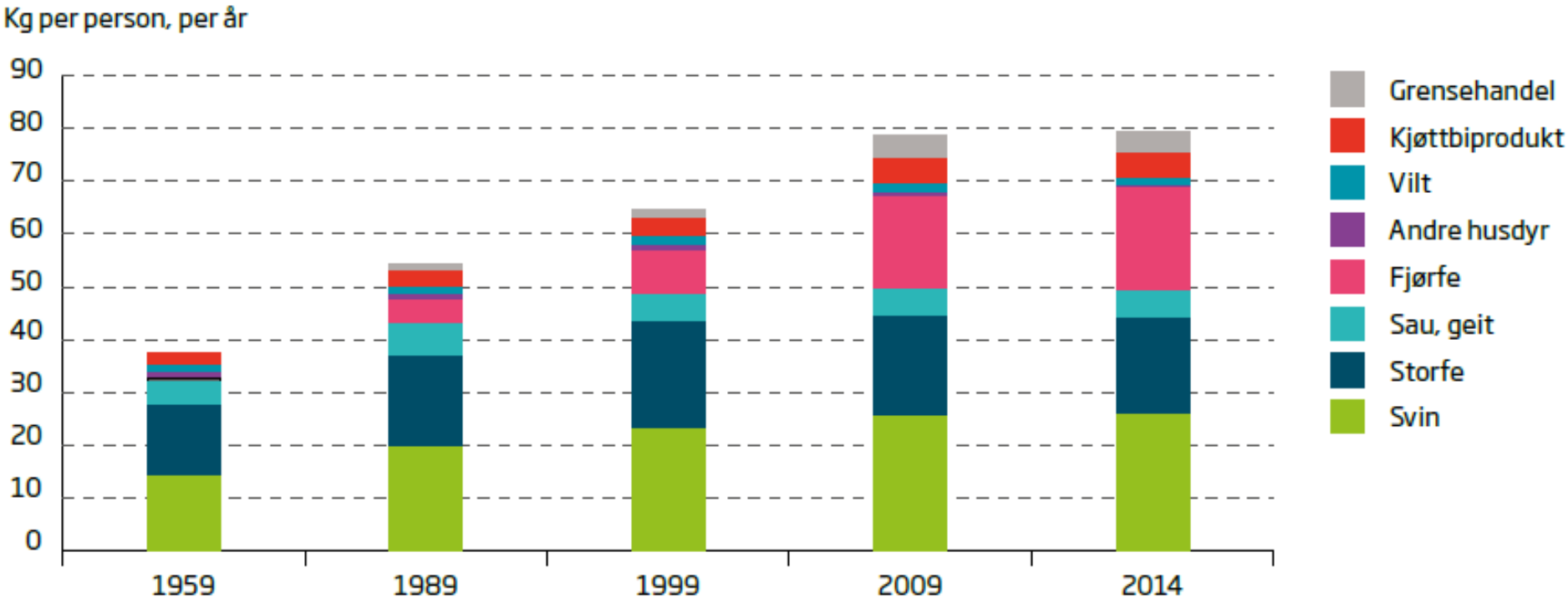
Norsk fôrforskning gjennom 100 år – selvfølgelig en suksess

Birger Svihus
birger.svihus@nmbu.no

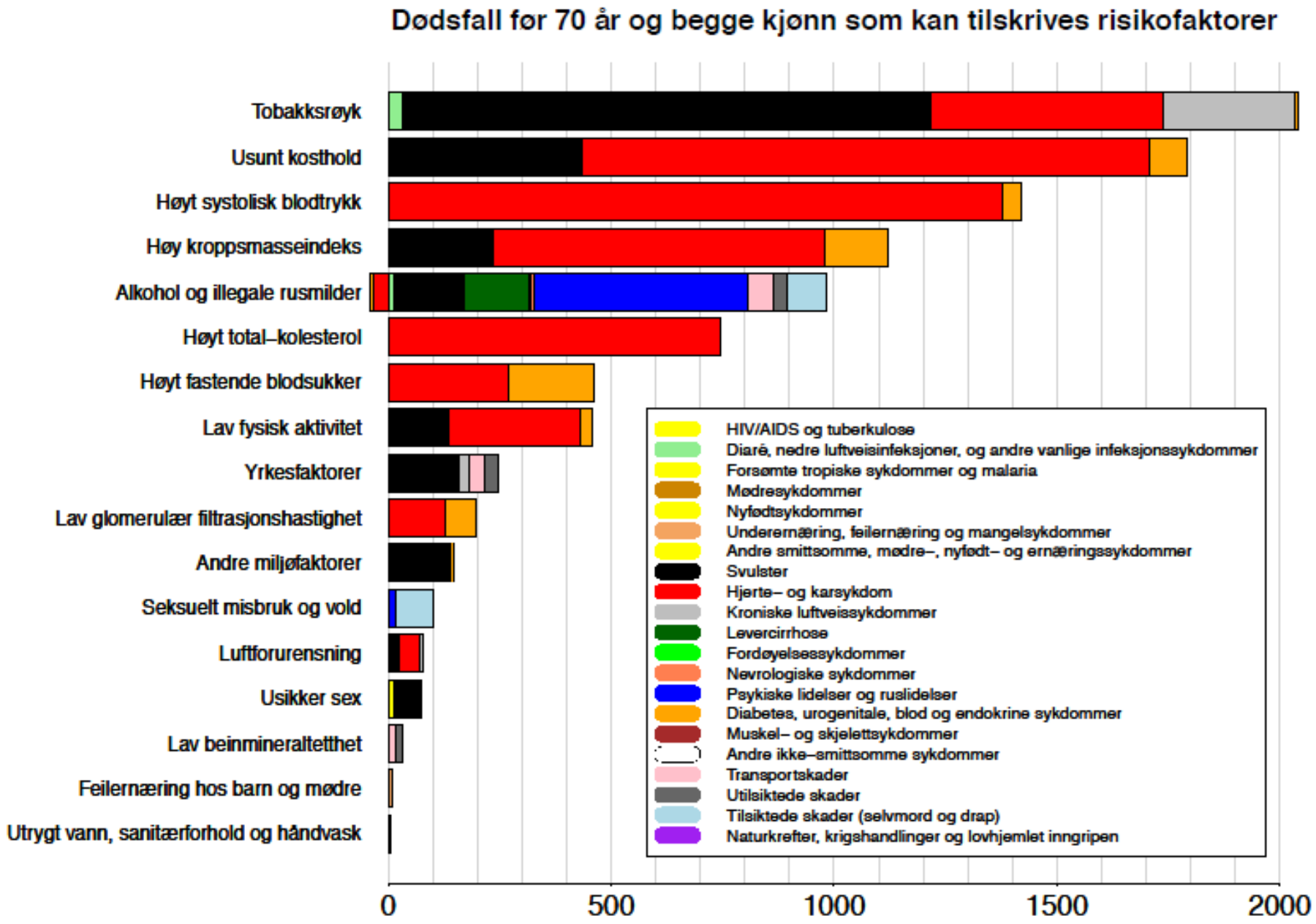

Kilocalories per capita/day
2500
2000
1500
1000
500
0
1964-66
1997-99
2030
Other
Pulses
Roots and tubers
Meat
Sugar
Vegetable oils
Other cereals
Wheat
Rice

Figur 8. **KJØTTFORBRUK ETTER DYRESLAG SAMT GRENSEHANDEL**



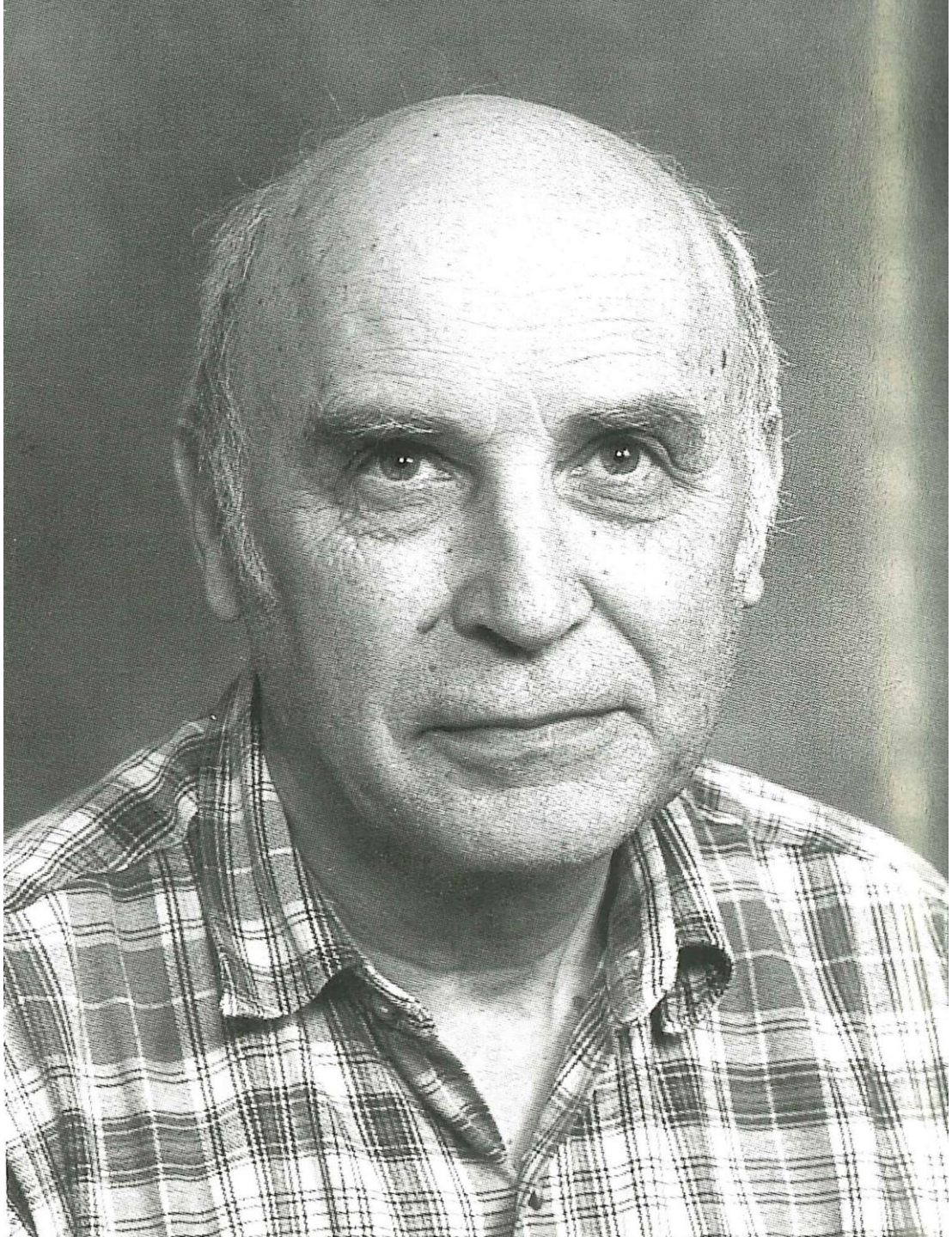
Utviklingen i norsk kosthold 2015. Rapport IS-2382. Helsedirektoratet, 2016

Figur 4: Forventet gjenstående levealder fra 35 års alder i Norge 1960-2009 gruppert etter utdanningsnivå (mørkeblå: grunnskole, lyseblå: videregående, grønn: høyere). Kilde: Steingrimsdottir, 2012.



Sykdomsbyrde i Norge 1990-2013. Folkehelseinstituttet 2016

Kurt Breirem



Sem landbruksskole, Asker

Protein Recovered from Industrial Waste Water as Feed for Chicks

OLAV HERSTAD and HARALD HVIDSTEN

Department of Poultry and Fur Animal Science, Agricultural University of Norway, Ås-NLH, Norway

Acta Agriculturæ Scandinavica 23 (1973)

Introduction

Waste water from such industrial installations as slaughter-houses, dairies, fish fillet factories, and the herring oil industry contains substantial quantities of dry matter which is lost into and contaminates the water recipients. Jantzen (1967) has developed a method for precipitating the proteins in such waste water by high molecular weight lignosulphonic acids or sulphite waste liquor residuals after torula yeast production. After purification and drying, the precipitate, called lignoprotein, and the yeast produced from the sulphite spent liquor, may be used as feeds. In these ways some of the polluting matter in waste water from the food industry and in the sulphite spent liquor are converted into animal feeds. Næss (1972) has emphasized the important ecological results of this recycling of waste material through animal protein production and back to soil in the biological cycle.

The method is patented (Jantzen, 1967) and a company is established which has applied the method for treating industrial waste water (Tønseth & Berridge, 1968).

In concord with the growing interest in preventing water pollution and the increasing demand for protein, the method will probably be used on a scale which can bring lignoprotein onto the market as an alternative protein feed for animals. We have therefore found it appropriate to report the results of our experiments. There is no essential difference between the lignoprotein used in these experiments and that produced by the commercial method.

Materials and Methods

In the experiments, weight gain and feed utilization of chicks fed lignoprotein are compared with

JOHN DEERE

ImageQuest

Ernæringsforskningens klassiske hovedtema

- Etablere næringsbehov
- Bestemme næringsstofftilgjengelighet og forbedre næringsverdien av råvarer
- Undersøke potensialet av nye råvarer

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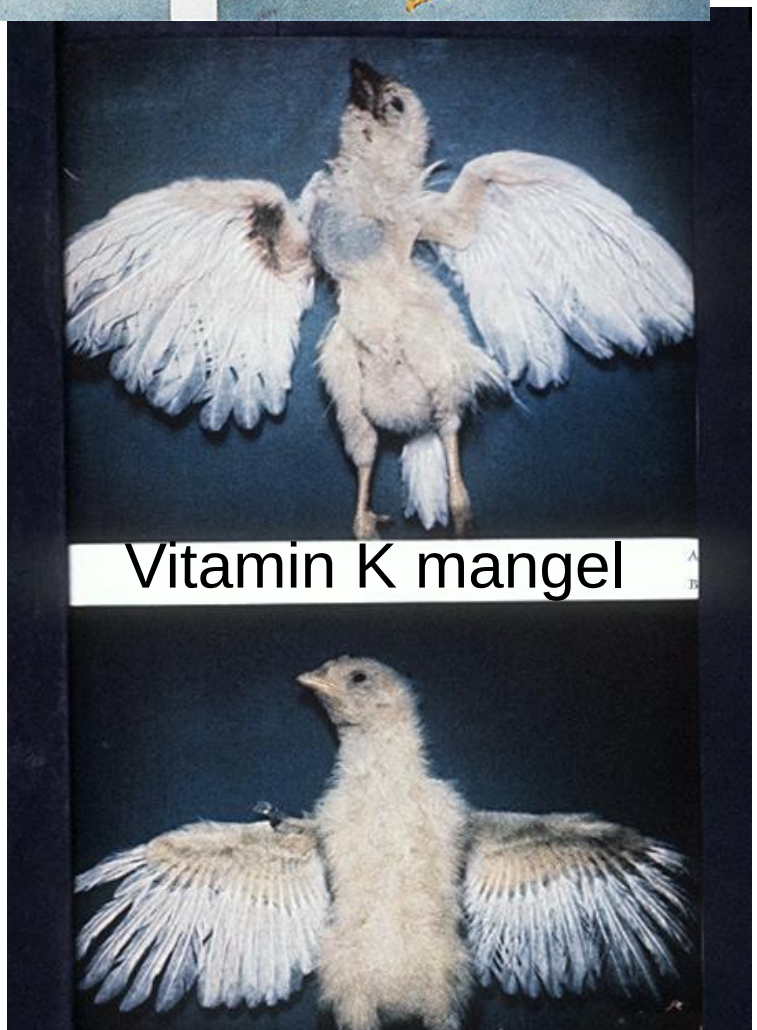
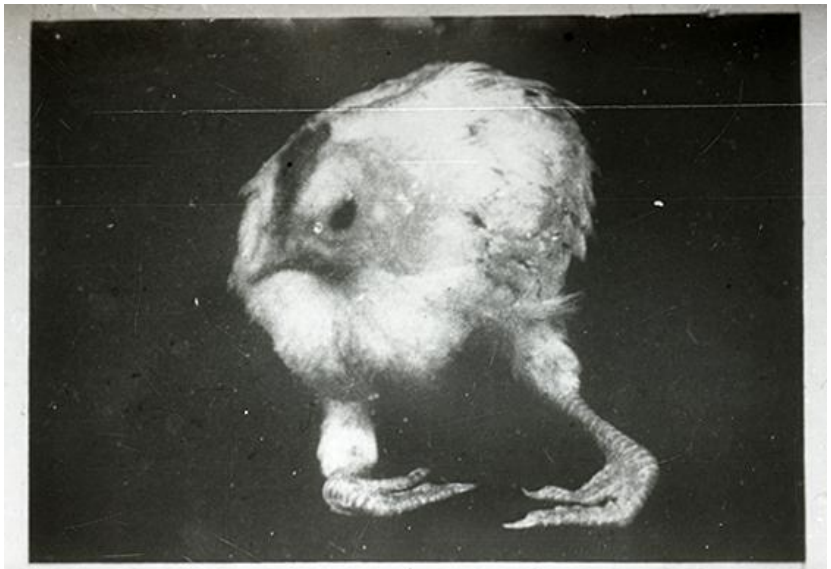
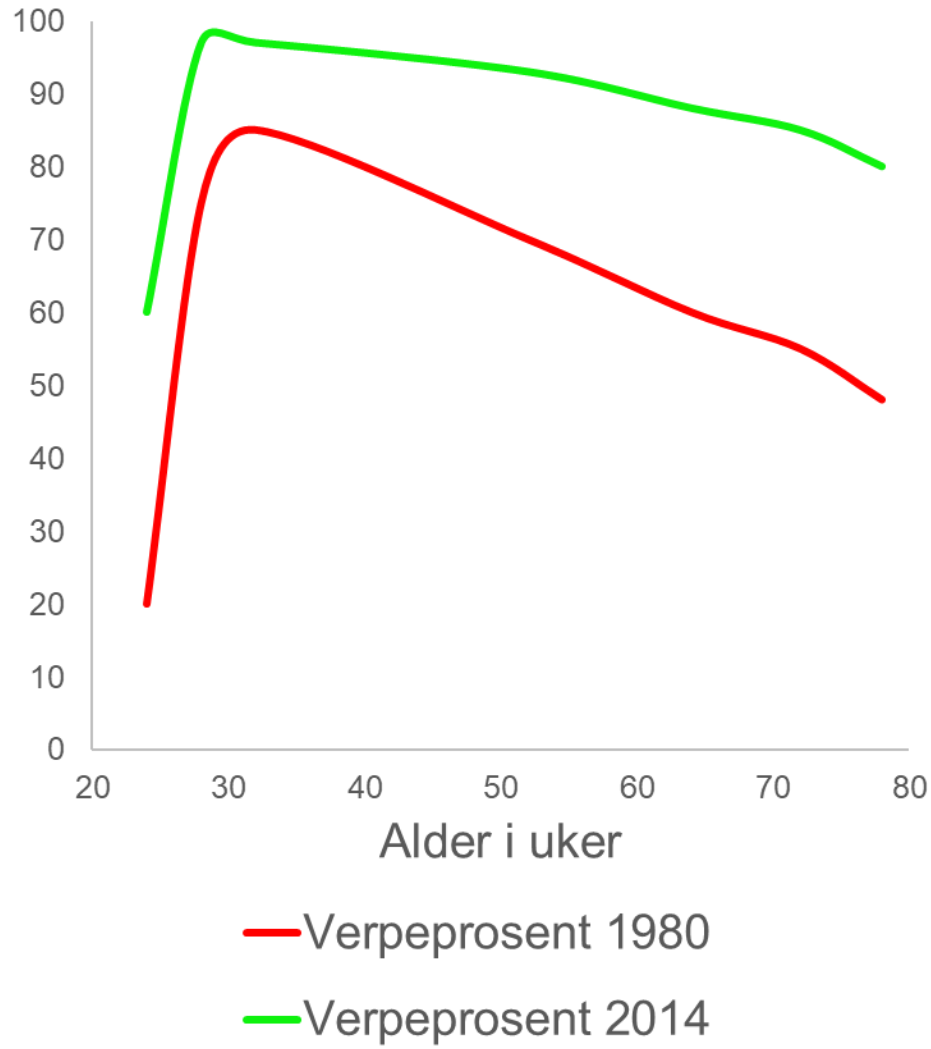


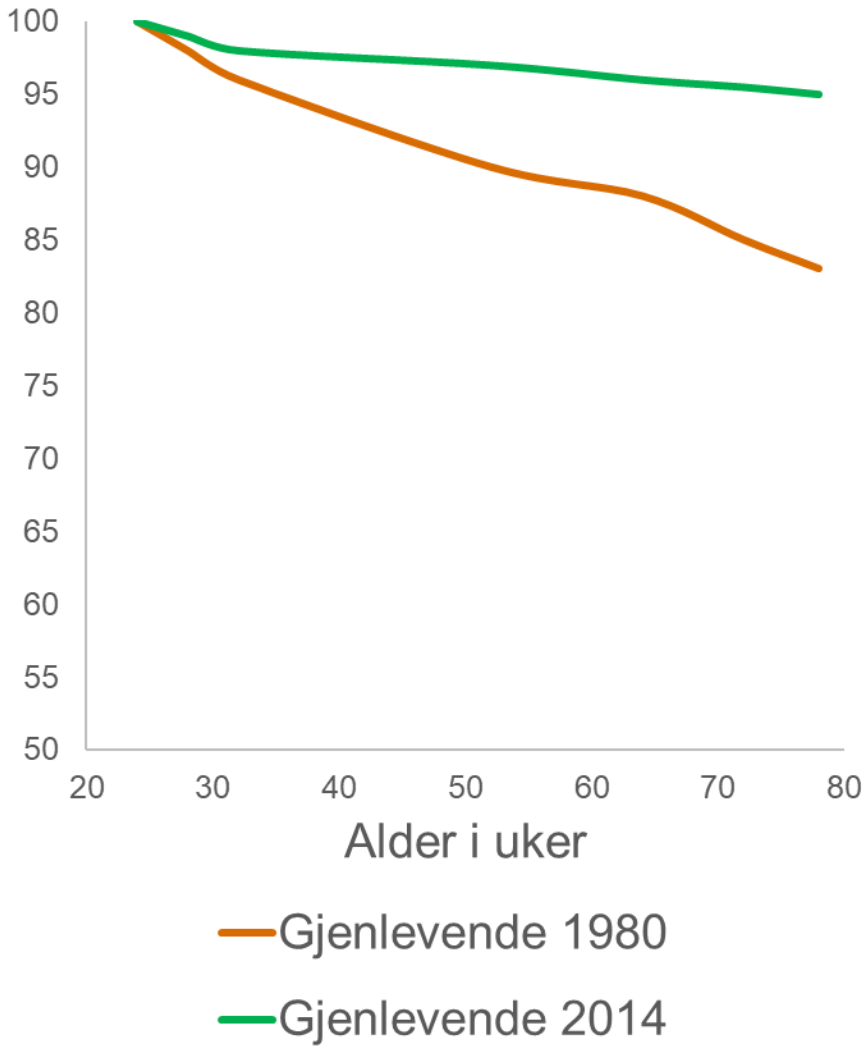


gure 23. Riboflavin deficiency in a young chick, causing curled toes and a tendency to squat on the hocks.

Strain	1957	1978	2005
0 d	34 g	42 g	44 g
28 d	316 g	632 g	1,396 g
56 d	905 g	1,808 g	4,202 g

Ytelse hos verpehøns i 1980 sammenlignet med i dag





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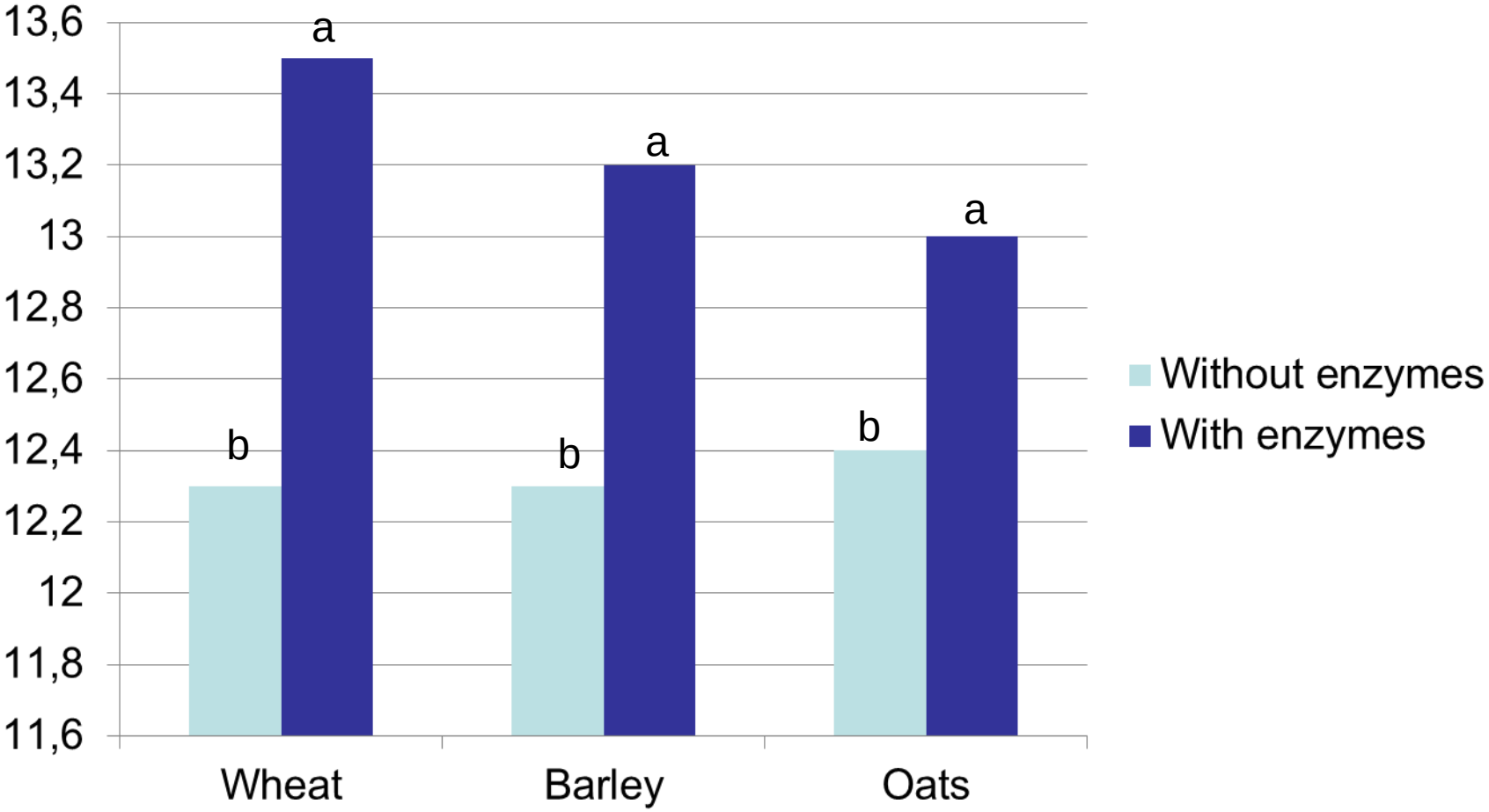
Effect of NSP-ases on metabolisable energy content (MJ/kg) measured in broilers (Svihus and Gullord, 2002)



Effect of low protein diets with amino acids supplied on performance of broilers

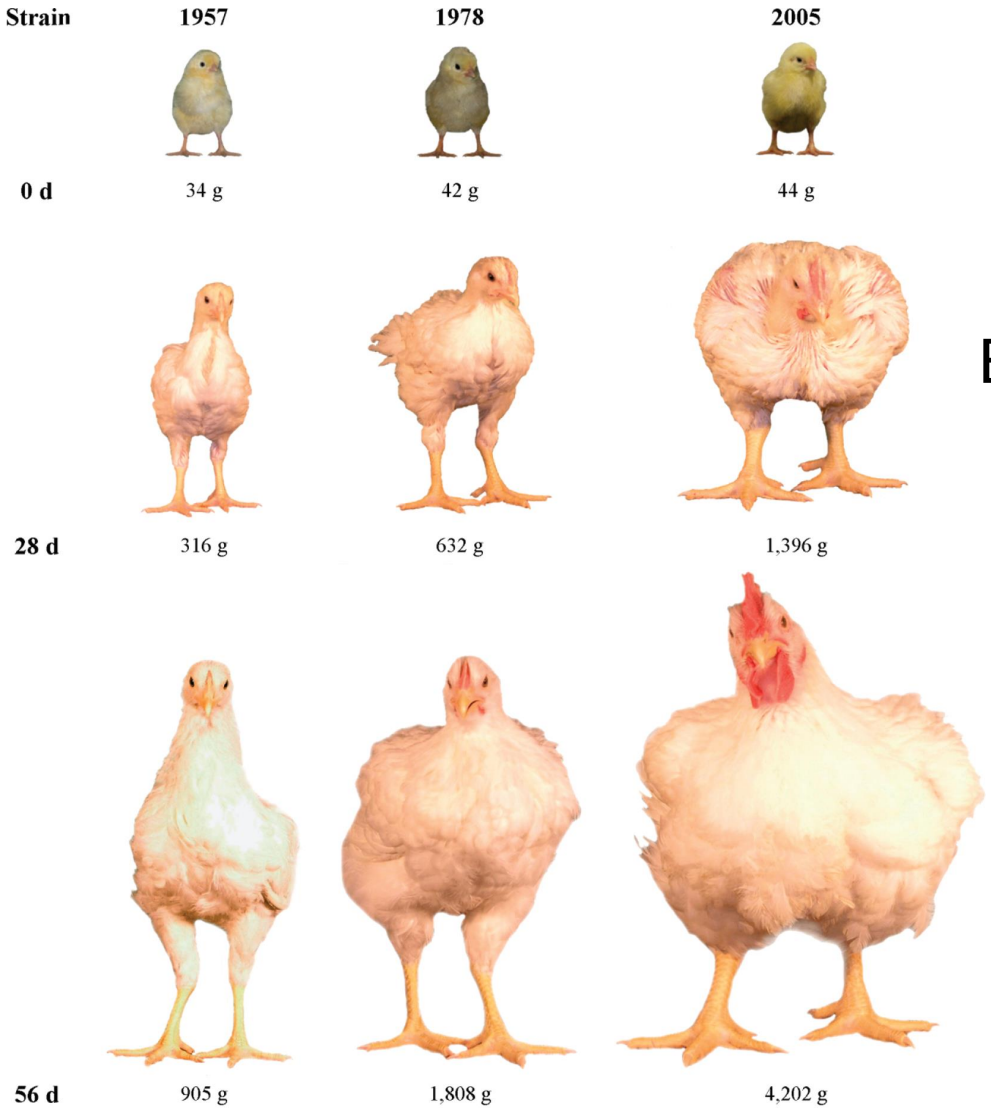
	Normal diet: 21.9 % 0-21 d, 19.4 % 22-44 d	Low diet: 17.0 % 0-21 d, 14.3 % 22-42 d
Feed intake, 0-21 d	1121	1118
Weight gain, 0-21 d	804	794
Feed/gain, 0-21 d	1.4	1.41
Protein efficiency ratio	3.23b	4.1a
Feed intake, 22-42 d	3133	3179
Weight gain, 22-42 d	1749	1732
Feed/gain, 22-42 d	1.79	1.84
Protein efficiency ratio	2.86b	3.71a

Awad et al. (2018) Br. Poult. Sci. 59, 340–348.

Efficiency of broilers over time, no correction for feed changes

	1957	1978	2005
Feed/gain	2.88	1.90	1.67
Protein/carcass	0.94	0.58	0.47

Zuidhof et al., 2014. Poultry Science 93: 2970–2982



Efficiency of broilers over time, 1957- and 2001-diets

	1957	2001
Feed/gain	2.34	1.63
Protein/carcass	0.83	0.45

Havenstein et al., 2003. Poultry Science 82: 1500–1518

Ernæringsforskningens klassiske hovedtema

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Fremtiden for fôrforskningen

- To skritt frem, ett tilbake?
  - Begrensninger i råvarebruk pga mattrygghets/velferdshensyn
  - Større fokus på dyrevelferd på bekostning av fôrutnyttelse
  - Reaksjonære produksjonsmetoder som følge av teknologifrykt

Typical performance results in some Norwegian broiler production systems

	Conventional	Slower growth	Organic	Very slow growth
Breed	Ross 308	Hubbard 787	Ross Rowan	Sasso
Slaughter age	33	45	74	65
Mortality	3.1	2.6	3.3	3.5
Feed/carcass	2.21	2.62	4.0	3.6
Protein/carcass	0.45	0.50	0.69	0.60