

THE FRENCH HAIL PREVENTION PROJECT



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Association Nationale d'Etude et de Lutte
contre les Fléaux Atmosphériques



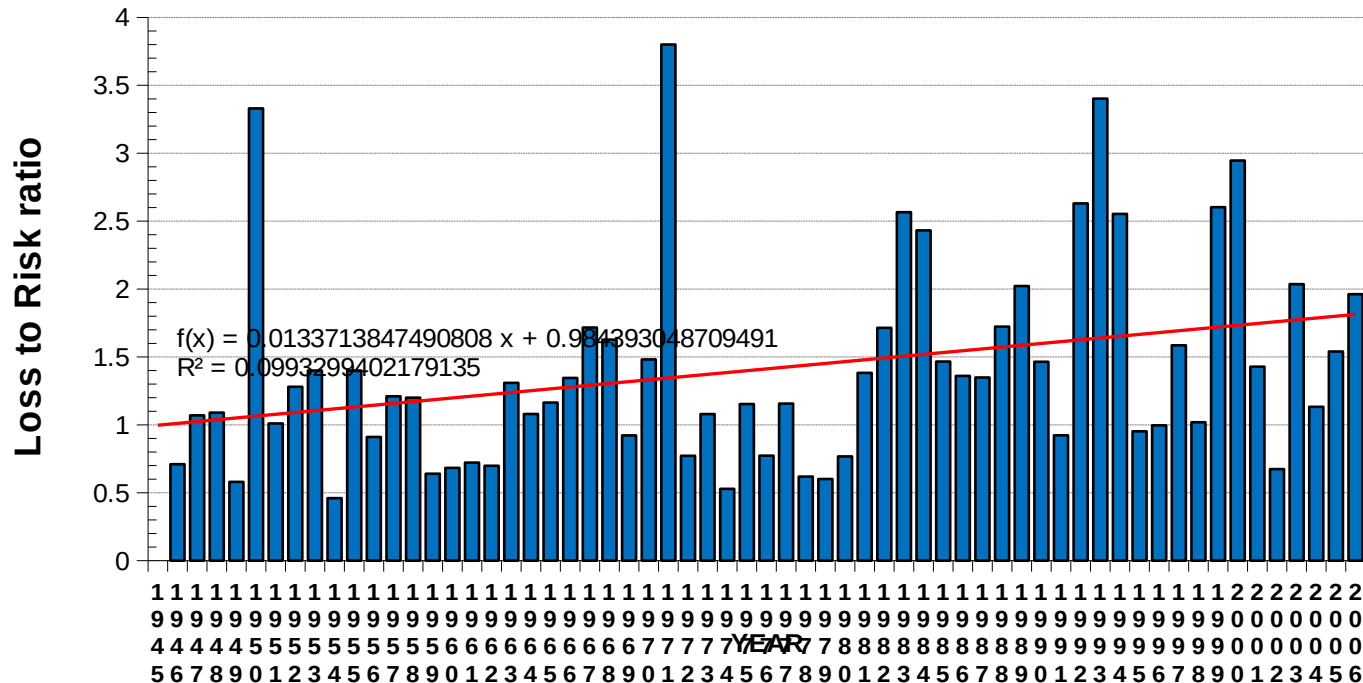
Annual crop losses (AIAG insurance data)

➤ Main european countries affected

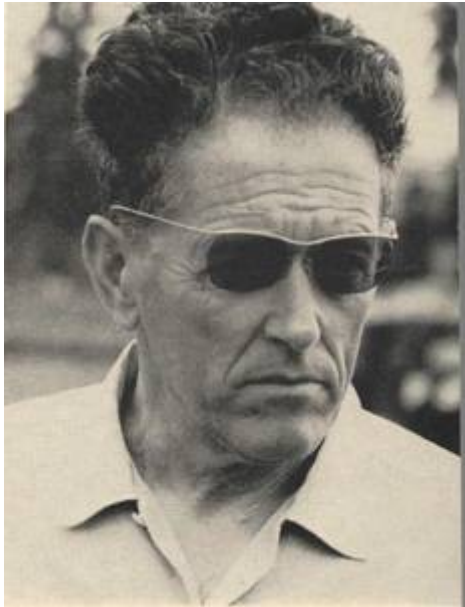
☐ SPAIN ☐ ITALY ☐ **FRANCE** ☐ GERMANY ☐ SWITZERLAND

➤ In average 162 M€ were paid by insurance for crop losses in France but only 1/3 of farmers got contract >> ~ 500 M€/year

☐ Loss to Risk ratio for crop insurance in France



NON PROFIT ORGANIZATION FOUNDED IN 1951



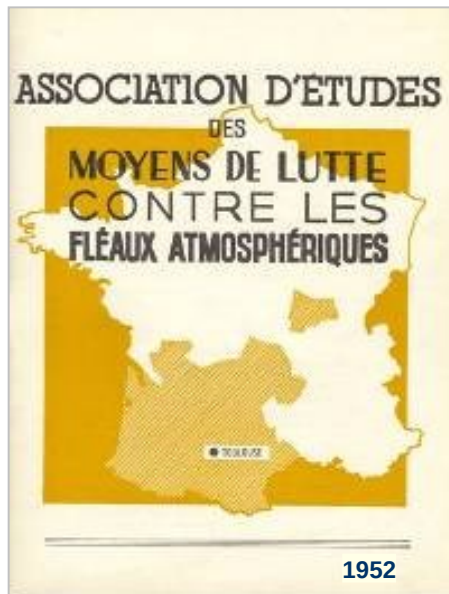
Henri DESSENS

Two GOALS:

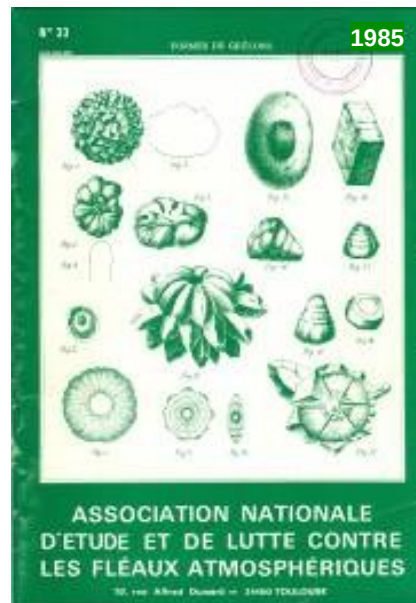
- ➔ Develop scientific research on cloud physics and weather modification,
- ➔ Perfect a method of treatment of storms aimed at mitigating hail damage to crops.

64 HAIL PREVENTION CAMPAIGNS

Year	1952	...	1985	...	2015
Number of generators	19	...	508	...	840



...



...



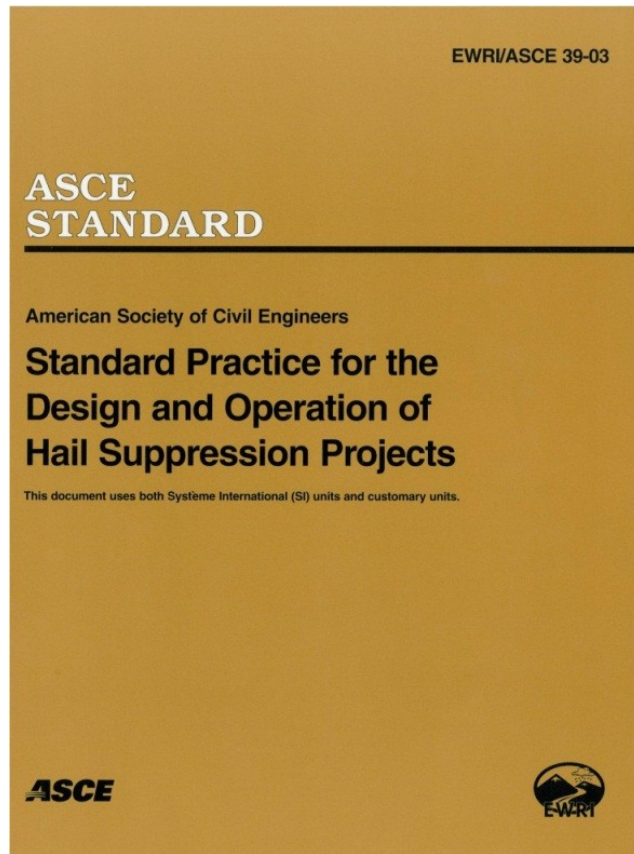
SUPPORT RESEARCH

**Ice nuclei
counter
(Soulage, 1953)**



**Study on silver iodide nuclei
diffusion with plane and helicopter
(Dessens and al., 1968)**

HAIL PREVENTION >> ASCE STANDARD



ANELFA method

- ☑ Treatment from the ground adapted to hailstorm cloud formation in France
- ☑ Operations in accordance with ASCE recommendations
- ☑ Efficiency measurement

ANELFA COORDINATE GROUND SEEDING

- Silver iodide solution is manufactured by Anelfa in order to verify quality
 - ⇒ Generators are assembled by Anelfa and belong to the national association
 - ⇒ Anelfa can provide any generator component
 - ⇒ Hailpads are processed by Anelfa

MANUAL GENERATOR

200 billion of
particules /s



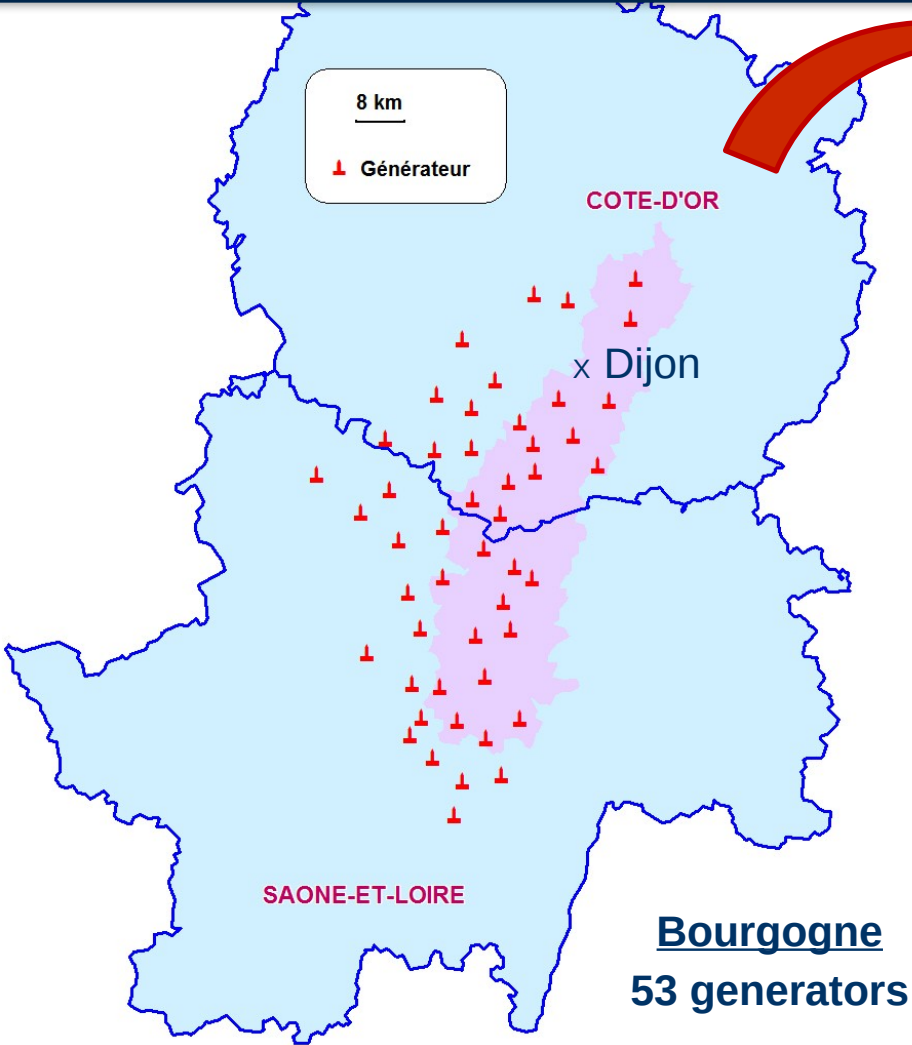
AIR PRESSURE

Silver iodide in
acetone tank

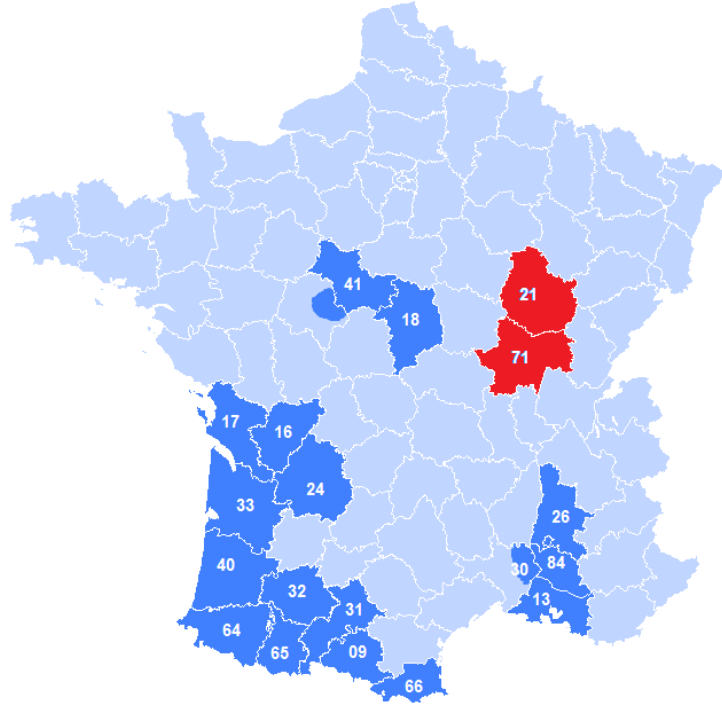
CHEMINEY



GENERATOR NETWORK



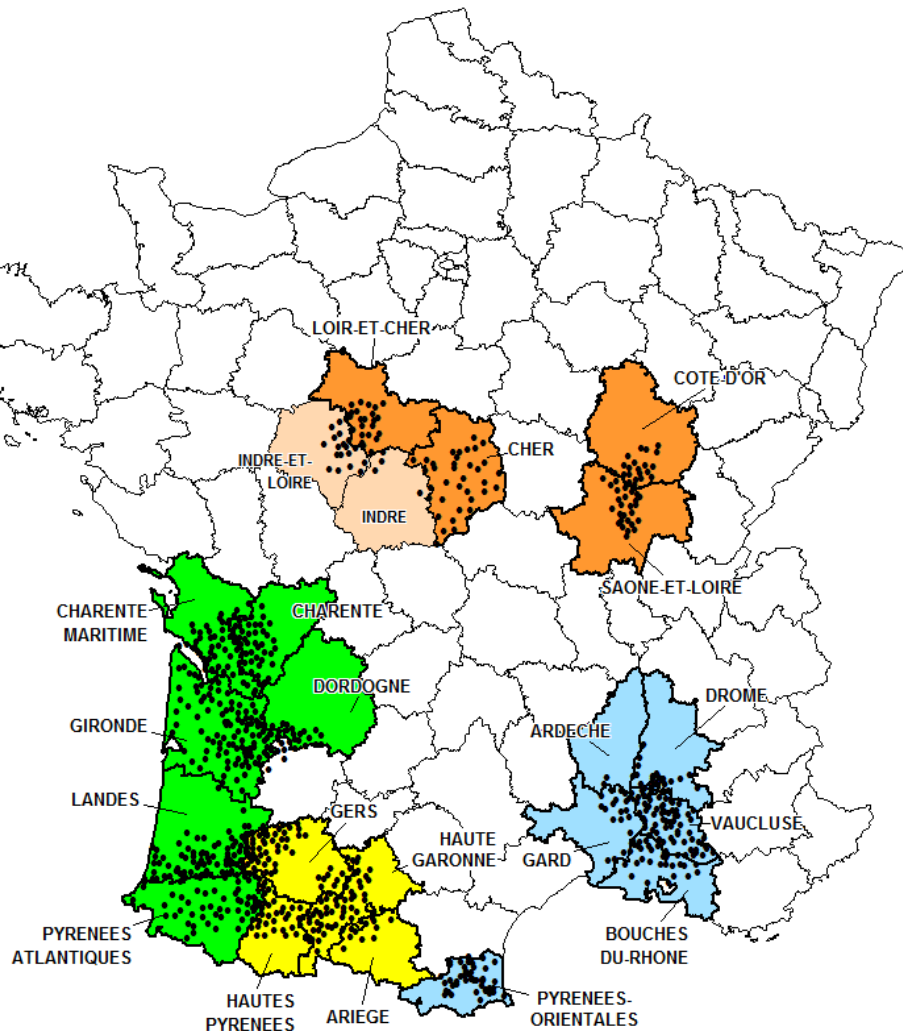
15 LOCAL ASSOCIATIONS
On 20 départements



ANELFA NETWORK (2015)

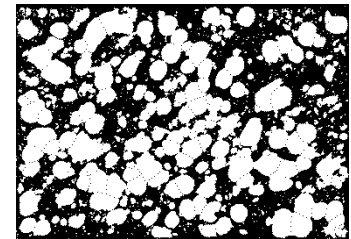
- AREAS**
- Atlantic
 - Midi-Pyrenees
 - Central
 - Mediterranean

• generator
— 60 km



840 generators

1275 Hailpad stations





KEAUNOS SERVICES

BETWEEN APRIL AND OCTOBER

WARNING



FORECAST
4 HOURS
BEFORE RISK

AUTOMATIC
PHONE CALL
SYSTEM



ALL THE VOLUNTEERS
OF THE AREA

15 to 20 warnings/year



Weather report (hail risk)



- ✂ Area concerned
- ✂ Hour of beginning and ending risk
- ✂ flashflood risk

MANUAL TURN ON



FUNDING

Financement des structures Départementales

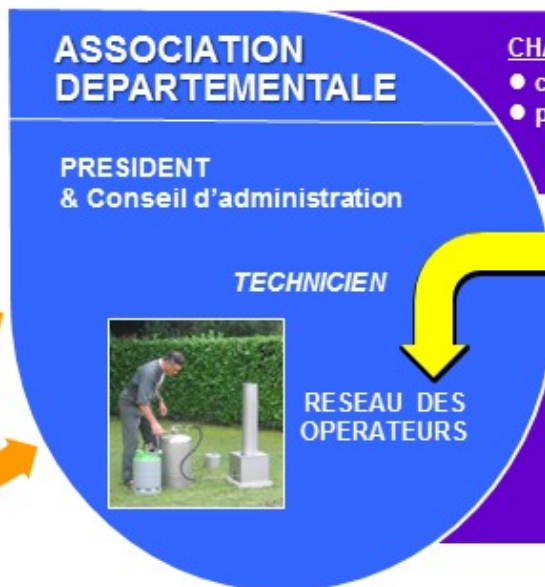


CONSEIL GÉNÉRAL
CONSEIL REGIONAL

COMMUNES
COMMUNAUTE DE COM.

CHAMBRE D'AGRICULTURE
STRUCTURES AGRICOLES
(ODG, SYNDICATS, COOP., ...)

ASSURANCES
BANQUES
ENTREPRISES PRIVEES



Financement de l'ANELFA

CHARGES FIXES :

- cotisation annuelle
- participation aux charges Communes

FRAIS DE FONCTIONNEMENT :

- solution
- matériel



ARELFA BOURGOGNE

3 000 km² >> 53 generators

130 000 €

ANELFA

- ☐ Makes Agl solution
- ☐ Assembles generators
- ☐ Measures hail

